THE AMERICAN REVIEW OF TUBERCULOSIS

OFFICIAL JOURNAL OF THE AMERICAN TRUDEAU SOCIETY
Medical Section of National Tuberculosis Association

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VOLUME 65
JANUARY–JUNE, 1952

PUBLISHED MONTHLY
AT MOUNT ROYAL AND GUILFORD AVENUES, BALTIMORE 2, MD.
BY THE NATIONAL TUBERCULOSIS ASSOCIATION

LIST OF JOURNALS ABSTRACTED

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THE AMERICAN REVIEW OF TUBERCULOSIS ABSTRACTS

Edited by LAWRENCE B. HOBSON

VOLUME 65 JANUARY, 1952 ABST. No. 1

CLINICAL STUDIES, TUBERCULOSIS

Pleurisy with Effusion.—A total of 909 cases of tuberculous pleurisy with effusion seen in Oslo, Norway, during the ten-year period 1926 to 1935 occurred in 445 men and 464 women. Of these, 720 (79 per cent) were available for follow-up examination. More than half occurred in the age group between 16 to 25 years. There was a slight preponderance in the men below 20 years; women predominated in the age group of 20 years to 25 years; thereafter men again predominated. The onset in most instances was in the months from February to June. Of the 720 patients available for follow-up examinations, 148 developed tuberculosis, a morbidity rate of 20.6 per cent. Furthermore, 66 of the patients had died of tuberculosis, a mortality rate of 9.2 per cent. Of the 148 who developed tuberculosis, 118 developed pulmonary disease; 6 of these also had extrapulmonary tuberculosis. Of the 30 with extrapulmonary foci, 7 had died from tuberculous meningitis. Ten had died of miliary tuberculosis. Two patients had had tuberculous peritonitis. In 6, a new pleurisy complicated with pericarditis occurred. Four developed osseous tuberculosis, and one developed renal tuberculosis. The morbidity and mortality of extrapulmonary tuberculosis was greatest in the first year after the onset of the effusion. The over-all tuberculosis morbidity and mortality was highest in the first five years after the pleurisy, as 81 per cent of the cases of tuberculosis and 83 per cent of the deaths occurred in this period. It is of note that pulmonary tuberculosis developed in 16 per cent later than ten years after the pleurisy. Both the morbidity and mortality for tuberculosis are less in the age group younger than 15 years than in the adult age. Males and females have similar morbidity and mortality rates. It is noteworthy that both the morbidity and mortality of tuberculosis following pleurisy with effusion were found to be decidedly lower in the ten-year period from 1926 to 1935 than in the preceding ten-year period from 1916 to 1925.—*The prognosis of tuberculous pleurisy, S. Frostad, Acta med. Scandinav., 1951, 139: 341.—(K. T. Bird)*

Epituberculosis.—Parallel clinical, bronchoscopic, and planigraphic examinations as carried out in 26 children with recent or indurative pulmonary changes following segmental density of the lung associated with primary pulmonary tuberculosis have shown that bronchostenosis is the essential feature in the disease. It occurs as a result of pressure on, and infiltration of, the bronchial wall adjoining a lymph node or, perhaps more often, as a result of caseous nodes rupturing into the bronchial lumen with resultant obstruction by caseous material or tuberculous granulation tissue. There is no reason for preserving the artificial differentiation between pure and non-pure epituberculosis, on the one hand, and a caseous pneumonia, on the other, as these lesions are all merely different manifestations of a pathogenetic unity with all transitions from a pure atelectasis via a more or less marked tuberculous inflammation to a destructive caseous pneumonia. An obstructive factor is always involved, which in some instances may give rise to an obstructive emphysema instead of atelectasis. Tubercle bacilli will be found in the vast majority of cases if searched for intently. Moreover, tubercle bacilli may be cultivated for several years despite extensive calcification of the lesions. Complete *restitutio ad integrum* seldom ensues. On the contrary, permanent changes are rather a rule than an exception. These permanent changes are of the nature of indurative lesions associated with bronchiectasis and can be

demonstrated by planigraphic examination. This bronchiectasis may be very marked roentgenologically and pathologically but seldom produces marked clinical symptoms which may be due to its predeliction for well-drained segments. Finally, the term epituberculosis in these cases is misleading. The suggested name for this bronchial lymph node syndrome is lymphadenitis tuberculosea bronchostenotica.—*Lymphadenitis tuberculosea bronchostenotica, K. Rogstad, Acta tuberc. Scandinav., 1951, 25: 305.*—(*K. T. Bird*)

Tuberculin Sensitivity.—This study was undertaken to determine the possible clinical significance of degrees of sensitivity to tuberculin. Intracutaneous tests were performed as follows: on the first day, with Old Tuberculin 1:1,000,000 (*A*), 1:500,000 (*B*), and 1:100,000 (*C*); later, with 1:10,000 (*D*) and then 1:1,000 and 1:100 (*E*). A positive reaction to *A*, *B*, or *C* was regarded as evidence of high sensitivity; to *D*, as medium; and to *E*, as low. Tests were made on hospitalized children including 229 with some form of tuberculosis. All except 6 patients reacted to *D* or less. The patients were grouped into various clinical categories: 90 per cent of the patients with primary tuberculosis were highly sensitive; most children with pleural effusion were only moderately sensitive; less than 20 per cent of patients with a calcified primary complex were highly sensitive. All of the children with miliary tuberculosis showed moderate or low sensitivity. One-third of the children with adult-type tuberculosis showed high sensitivity; the rest showed moderate or low. Six cases reacted only to *E*; of these, 2 were healed primary, 2 advanced adult-type with positive sputum, and 2 were miliary. If the cases of healed primary are excluded, of 208 cases of pulmonary tuberuclosis, 204 were positive to *D* or weaker strengths; to phrase it differently, more than 98 per cent showed moderate or high sensitivity. Clinically, a well child with positive radiologic findings who shows only moderate sensitivity is unlikely to have active primary tuberculosis. If he shows low sensitivity, he is unlikely to have any form of pulmonary tuberculosis unless far advanced. Moderate sensitivity favors a diagnosis of the adult type of disease. It is concluded that the estimation of tuberculin sensitivity may be of real value clinically. Patients who had pulmonary tuberculosis with a history of recurrent erythema nodosum showed the same variation in sensitivity as patients without it. Pleural effusion and other complications were associated with lowering of sensitivity. This is also true of many nontuberculous complications.—*Tuberculin sensitivity in children suffering from pulmonary tuberculosis, S. Gazybowski, Tubercle, July, 1951, 32: 145.*—(*A. G. Cohen*)

Blood Volume in Tuberculosis.—The average patient with tuberculosis has a reduced red-cell mass, increased plasma volume, reduced total serum protein, and an increased interstitial fluid volume. These changes are more marked in those patients judged to be in poor clinical condition. There is also a prothrombin deficit and probably a deficit of other protein compounds such as antibodies. The corrective measures suggested are a high-protein intake and transfusions of 2,000 to 3,000 cc. of whole blood before surgery. Although the present studies were primarily designed to evaluate the preoperative preparation in tuberculosis, the abnormalities found can be utilized in medical treatment as well. The increase in plasma volume and extracellular fluid (thiocyanate space) volume in these patients is interesting. The greater increase in those patients who have a reduced cell mass suggests a compensatory mechanism.—*Blood volume and extracellular fluid in tuberculosis, E. B. Hay, C. R. Hay, & D. E. Jenkins, J. Thoracic Surg., January, 1951, 21: 42.*—(*R. E. MacQuigg*)

Psychosomatic Approach to Tuberculosis.—To develop chronic active tuberculosis, the person needs (*1*) tubercle bacilli, (*2*) moderately inflammable lungs, and (*3*) some internal or external factor which lowers resistance to the disease. External factors are starvation, captivity, fatigue, et cetera.

Internal factors include diabetes and so on. There still remain cases in which these factors are not present. In some of these it was found that a major psychic trauma had occurred some time during the previous eighteen to twenty-four months. Applications of this fact can be made therapeutically.—*The psychosomatic approach to pulmonary tuberculosis, G. Day, Lancet, May 12, 1951, 1: 1025.*—(*A. G. Cohen*)

Bleeding in Artificial Pneumothorax.—This article reviews 37 cases of artificial pneumothorax complicated by intrapleural hemorrhage of at least 600 cc. Six followed refills, of which approximately 180,000 were given during the relevant period. The other 31 cases followed the section of adhesions in a total of 814 patients. The bleeding may be spontaneous or traumatic; any vessels in the chest wall, pleura, or lung may be the source. Primary clotting occurs soon after bleeding, which is rarely massive. The clot is soon fragmented. The blood acts as a foreign body and secondary clotting begins as early as the second week. Therefore, secondary clotting can be prevented by early aspiration. This should be done as frequently as necessary to keep the pleural cavity empty. Once secondary clotting has occurred, other measures are required. Streptokinase and streptodornase have been employed therapeutically. Evacuation of the clot through a thoracoscopic cannula has been used with success. Should these measures fail to remove the clot, thoracotomy and clot removal should be undertaken. The author does not approve of thoracotomy merely for locating the bleeding point. In the current series of 37 cases, treated by all methods, the pneumothorax was unaffected in 20, partially lost in 12, and lost in 5. The incidence of obliteration was the same whether the volume of blood was greater than or less than 1,500 cc.—*Intrapleural haemorrhage in artificial pneumothorax, J. T. Harold, Thorax, June, 1951, 6: 162.*—(*A. G. Cohen*)

Bleeding in Extrapleural Pneumothorax.—The bleeding and coagulation times, as well as the other characteristics of the blood, are usually normal in cases of hemorrhage occurring within forty-eight hours after the surgical preparation of an extrapleural space. It was thought likely that these hemorrhages were due to such local factors as capillary trauma and the effects of histamine liberated locally. Histamine and histamine-like substances cause capillary vasodilatation, dilatation of the arterioles and small veins in the surrounding area, and increase vascular permeability with passage of plasma and corpuscular elements through the vascular walls. In accordance with these views, a series of preventive measures were instituted, consisting of the administration of rutin, 60 to 90 mg., with ascorbic acid for a few days before the intervention, followed by injections of vitamin P for a few days after the operation. Antihistaminic drugs, such as Benadryl, were tried. Painstaking hemostasis during the operation, of course, was essential. Following the adoption of these measures, no serious hemorrhages occurred during the last two years.—*Ensayo de patogenia y normas para una profilaxis de las hemorragias postoperatorias en la neumolisis extrapleural, S. Almansa de Cara, Rev. españ. de tuberc., November, 1950, No. 188: 715.*—(*L. Molnar*)

Extrapleural Plombage.—The author has used alkathene, which is a polyethylene plastic, for extrapleural plombage in 30 cases. The material is formed into a bag which is shaped to conform to the extrapleural cavity. The bag is then hermetically sealed and blown up with air. He believes that many of the shortcomings of Lucite balls are averted.—*Extrapleural plombage with alkathene, C. Xalabarder, Tubercle, July, 1951, 32: 152.*—(*A. G. Cohen*)

Broncho-Extrapleural Perforation.—Following the formation of the extrapleural space and the insertion of Lucite spheres, a small amount of bleeding occurs into the space. In addition, an effusion appears within a few days which, while rarely extensive, is sufficient to cause a low-grade febrile reac-

tion for a week or ten days. As the effusion is resorbed, a small serofibrinous exudate fills the interstices between the spheres. This produces a characteristic pattern of density between the spheres on the roentgenogram. Even where little reaction occurs, it is of the utmost importance to recognize that there is invariably some opacity in the spaces between the spheres. When perforation occurs through the extrapleural shelf, with production of a communication between the lung parenchyma and extrapleural space, the roentgenogram undergoes a striking change which is probably pathognomonic. Air finds its way into the interstices between the spheres, and the spheres then appear sharply outlined by contrast with the surrounding air. If a moderate amount of serum is still present between the spheres prior to perforation, a fluid level may develop simultaneously. Early recognition and evaluation of perforation is of the utmost importance in order that procedures demanded for its treatment be immediately instituted.—*A new roentgen sign of broncho-extrapleural perforation in Lucite plombage, A. Hurst & M. A. Levine, Am. J. Roentgenol., July, 1951, 66: 37.*—(*T. H. Noehren*)

Tuberculous Abscesses and Fistulas.—Tuberculous abscesses and fistulas are difficult to treat conservatively and do not readily respond to intramuscular administration of streptomycin. In severe cases, excision and/or curettage combined with antibiotic treatment are the methods of choice. Streptomycin, *p*-aminosalicylic acid, and penicillin were used in various combinations and by various routes in 5 operated cases.—*De Behandeling van Tuberculeuze Abscessen En Fistels, P. J. Kooreman, Nederl. tijdschr. v. geneesk., June 16, 1951, 95: 1730.*—(*J. van der Vate*)

Roentgenotherapy of Residual Cavities.—Of 10 cases of residual cavities after thoracoplasty treated with roentgenotherapy during the last two years, cavity closure with sputum conversion was obtained in 4 cases; in 2 cases the treatment was ineffective, and in one case the treatment was followed by an enlargement of the cavity and worsening in the general condition; 3 cases are still under treatment. The dosage was limited to one-twentieth of the erythema dose, i.e., 26 r. units, in series of three or four sessions. After an interval of at least four weeks, the treatment could be repeated. Close supervision during the treatment was essential and the possibility of cumulative effect had to be kept in mind. Considering that residual cavities are, for the most part, the expression of local disease and show a shrinking tendency and also because any other form of treatment is often very disappointing, the indication of roentgenotherapy in these cases seems to be justified.—*Zur Röntgenbestrahlung von tuberkulösen Restkavernen nach Thorakoplastik, H. Deist, Deutsche med. Wchnschr., September 29, 1950, No. 39: 1285.*—(*L. Molnar*)

CLINICAL STUDIES, NONTUBERCULOUS DISEASES

Pulmonary Moniliasis.—The concept of pulmonary moniliasis as a primary disease entity has not been accepted universally. However, there is strong evidence that the organisms are pathogenic in man and capable of producing the lesions and clinical findings described. The controversial question of whether an infection is primary or secondary is of little consequence in view of the demonstrated pathogenicity of *C. albicans*. The important features are that the infections, while not immediately fatal, are serious; the end results of widespread tissue destruction and fibrosis are crippling; and the patients are impaired physically, psychologically, socially, and economically. The diagnosis of pulmonary moniliasis is not without difficulty. The clinical aspects of such infections are neither clear-cut nor in themselves specific. Chest roentgenograms may suggest the diagnosis but the diagnosis can be made only from the proper examination of carefully collected sputum specimens. Studies for pathogens other than *C. albicans* must be exhaustive. Treatment is difficult, largely empiric, and

varied with no uniformly successful single measure. The most useful therapeutic agents at the present time are the iodides and vaccines. While the need for caution in the presence of suspected or recent tuberculosis has been stressed, it may be possible to avoid the danger of fatal dissemination of *M. tuberculosis* by the concomitant administration of streptomycin and iodides. Antibiotics have been tried unsuccessfully. Clinical data on 6 patients, with the post-mortem findings in one case, illustrate the characteristics of the disease and the difficulties encountered in diagnosis and treatment.—*Pulmonary moniliasis, R. W. Oblath, D. H. Donath, H. G. Johnstone, & W. J. Kerr, Ann. Int. Med., July, 1951, 35: 97.*—(*T. H. Noehren*)

Q Fever.—Two serologically proved cases of Q fever occurred in the same family. The initial contact was thought to be a research physician, a roomer in the patient's home, who worked in the Q-fever laboratories of the National Institutes of Health at Bethesda. The disease is to be suspected in cases with malaise, fever, headache, and pulmonary infiltration and may be easily confused with grippe, "flu", or atypical pneumonia. A definitive diagnosis can be made by serologic studies only.—*Q fever, H. H. Waldo, U. S. Armed Forces M. J., June, 1951, 2: 921.*—(*E. A. Riley*)

Nonspecific Pneumonitis.—It has been said that Pancoast's syndrome is universally due to a malignant lesion and always proves fatal. Nonspecific pneumonitis in the apex of the left upper lobe of a patient, however, produced some symptoms characteristic of the superior pulmonary sulcus syndrome of Pancoast and pathologically resembled the so-called middle lobe syndrome of Graham, Burford, and Mayer. The short duration of the illness before resection of the left upper lobe may account for the absence of the more serious symptoms and signs of the superior pulmonary sulcus syndrome. The excised lobe contained enlarged firm lymph nodes which encircled the bronchi but produced no extrinsic compression, endobronchial stenosis, or bronchiectatic changes. The changes in the parenchyma were typically those of a nonspecific inflammatory pneumonitis. Apparently the "middle lobe syndrome" is not a distinct entity of a middle lobe atelectasis but may occur elsewhere in the lungs without bronchial stenosis and the bronchiectatic changes of obstructive pneumonitis.—*Nonspecific pneumonitis of the left upper lobe (simulating the "middle lobe syndrome" and producing an early superior pulmonary sulcus syndrome), W. M. Ashe, J. R. McDonald, & O. T. Clagett, J. Thoracic Surg., January, 1951, 21: 1.*—(*R. E. MacQuigg*)

Ocher Silicosis.—Characteristic pulmonary changes consisting of very fine mottling and a reticulated appearance in the lateral parts of the upper and middle lung fields were noted in 8 workers who had been exposed for many years to the inhalation of ocher dust. The case histories and the roentgenologic features of 5 of these cases are reported. In 4, the appearance of the pulmonary changes corresponded to that of a second-stage silicosis except for the markedly fine character of the nodulation. Patchy fibrosis was present in only one patient, a worker who had been exposed to ocher dust for 52 years. The roentgenologic appearance of these lesions was very similar to that of sidero-silicosis which is observed in workers engaged in iron ore extraction. Characteristic of ocher lung is the long exposure time needed for its development, probably related to the low silica content of ocher which is a variety of fine clay-containing iron, commonly red or yellow in color, occurring in nature combined with silica-containing material. The true silicotic nature of these lesions is proved by the occupational history, clinical course, and roentgenologic appearance, in contrast to siderosis and hemosiderosis which are caused by iron oxide deposits in the alveoli, without a silica-containing factor.—*Über das Röntgenbild der Ockerstaublunge, R. Haubrich, Fortschr. Röntgenstrahl., December, 1950, 73: 682.*—(*L. Molnar*)

Bronchiolitis in Infancy.—Epidemiologically, bronchiolitis is a disease of winter and spring and parallels in incidence the other respiratory infections. Its greatest incidence occurs in the two-to four-month age group. Absence of evidence incriminating a specific etiologic agent leaves bronchiolitis an anatomic diagnosis. The underlying pathologic changes vary from a mere catarrhal plugging of the lower bronchioles to a leukocytic infiltration through the bronchiolar walls into the interstitial tissues. Emphysema is always present. The treatment of choice is the prophylactic use of sulfadiazine, oxygen and cold water vapor, mild sedation, symptomatic treatment, and good nursing care. Of prime importance should be the prevention of contact of the newborn and infants up to eight months old with persons having respiratory infections. Hypoxemia, toxemia from the infection, and the increased strain on the cardiac muscle from the pulmonary congestion induce reversible cardiac damage. Electrocardiograms were abnormal in 37 per cent of those on whom electrocardiograms were made. These changes were diffuse and followed no specific pattern. Because there were no changes in the P-R segment and recovery was the rule, probably the changes noted were caused by a temporary functional maladjustment (Authors' summary).—*Bronchiolitis in infancy, clinical study with special emphasis on the cardiac complications, A. T. Henderson & S. Rosenzweig, U. S. Armed Forces M. J., June, 1951, 2: 943.*—(*E. A. Riley*)

Pulmonary Embolism of Amniotic Fluid.—An autopsy was performed approximately four hours after the patient died suddenly during labor. The lungs were normal except for a large depressed, apparently superficial atelectatic area over the lateral surface of the lower lobe of the left lung. The pulmonary arteries exhibited no obvious emboli, and the bronchial tree was clear. There was a longitudinal tear 10 cm. long in the left wall of the uterus, apparently not recent because it was surrounded by old, brownish-red blood. Sections from the area of the uterine tear showed some large myometrial vessels containing lightly staining basophilic fluid with a stringy precipitate, clustered polymorphonuclear leukocytes, and large aggregates of "squamae" (keratinized squamous cells). Sections of the lung lesion showed some terminal branches of the pulmonary artery packed with blood and others partly or completely filled with mucinous material similar to that found in the uterine veins. Here, however, the "squamae" were not numerous. Such cases are rare and there seem to be no reliable signs by which this phenomenon can be recognized in its early stages.—*Pulmonary embolism of amniotic fluid, S. M. Bouton & J. R. Saunders, Am. J. Clin. Path., June, 1951, 21: 566.*—(*J. S. Woolley*)

Fatal Myocardial Sarcoidosis.—A 51-year-old white man had enlargement of the heart to the left, with a presystolic gallop of the apex, and enlargement of the liver. The roentgenogram of the chest showed a moderately enlarged heart with elongation of the left ventricular contours, widening of the superior mediastinal shadow, pulmonary congestion, and minimal interstitial fibrosis. Electrocardiographic examinations revealed auriculoventricular block, varying S-T changes, and, finally, auricular flutter. The patient died in cardiovascular failure. At autopsy there were widespread sarcoid granulomata in the lungs, heart, lymph nodes, spleen, liver, pancreas, and thyroid. This is the first case of death due to myocardial sarcoid in a white man, 8 previous cases having occurred in Negroes.—*Fatal myocardial sarcoidosis, R. Yesner & M. Silver, Am. Heart J., May, 1951, 41: 777.*—(*G. C. Leiner*)

Pulmonary Artery Thrombosis.—Thrombosis in the pulmonary arterial tree is usually secondary to embolism from the systemic veins or from the right side of the heart. Less often it occurs *in situ* as a result of parenchymal pulmonary disease or from altered circulation of the pulmonary tree. Infarction may or may not result. Symptoms may be primarily those of the thrombosis itself or, in cases of long

standing, embarrassment of the right ventricle with chronic cor pulmonale. Such thrombi produce alterations in the pulmonary circulation which may be detectable in chest roentgenograms. When the thrombus is located in a major vessel and causes a relatively high degree of obstruction, the following changes may ensue: (*1*) dilatation proximal to the block, (*2*) enlargement and alteration in the contour of the vessel at the level of the thrombus, and (*3*) decrease in the caliber of the vessels distal to the thrombus, causing increased radiolucency in the corresponding area of the lung. When multiple thrombi are located in branches of the third and fourth order, a somewhat similar appearance with enlargement of major vessels and avascular lung fields may be observed. Differentiation from other causes of hilar change and alteration in vascular pattern may be difficult. Such changes were shown in 5 cases of major vessel thrombosis and one case of multiple peripheral thrombi.—*Pulmonary artery thrombosis: Roentgen manifestations, J. Hanelin & W. R. Eyler, Radiology, May, 1951, 56: 689.*—(*W. J. Steininger*)

Pulmonary Artery Obstruction.—A case of acquired incomplete occlusion of the left pulmonary artery, demonstrated during life by angiocardiography, is reported. The wider use of pulmonary angiography for suspected pulmonary artery obstruction is suggested. The frequency of tuberculosis associated with pulmonary artery occlusion suggests that arteriography should be used more often in tuberculous patients who show either a diminished vascularity of one lung, as compared to the other, or significant displacement of the hilar shadow, or both. Angiography is particularly helpful in differentiating pulmonary artery obstruction from other conditions which might cause diminished vascularity of a lung or part of a lung, such as compensatory emphysema, localized emphysema, and bronchostenosis with a valve effect. Pulmonary artery obstruction is not incompatible with life. Although sudden death may result from the effects of acute cor pulmonale, the patient may live for weeks or years. The management of the acute attack is similar to that of acute coronary occlusion: absolute rest, oxygen, morphine or demerol, aminophyllin, and digitalization when right ventricular failure seems imminent.—*Pulmonary artery obstruction: Report of a case with angiocardiographic demonstration, W. S. Tirman, J. L. Eisaman, & J. T. Lloyd, Radiology, June, 1951, 56: 876.*—(*W. J. Steininger*)

Isolated Pulmonary Stenosis.—Among 250 patients with congenital heart disease studied by venous cardiac catheterization, 21 cases of isolated pulmonary stenosis were found. Twelve were male and 9 were female. The youngest patient was four years old, the oldest thirty-eight years. Six patients were asymptomatic, 10 patients had slight symptoms, and 5 had moderate symptoms. Symptoms include dyspnea, palpitations, precordial pain on severe or moderate exertion, and sometimes fainting. No relationship to the degree of pulmonary stenosis, as judged from the pressure in the right ventricle and the degree of cardiac discomfort, was found to exist. A constant clinical finding in these patients is a harsh systolic murmur filling the entire interval between the first and second heart sounds. Exceptionally, the murmur is faint. The maximal intensity of the murmur is at the left sternal border, generally in the second left intercostal space. A diastolic murmur was never found. Usually the second pulmonic sound was stronger than the second aortic sound, although it was accentuated only exceptionally. A strong second pulmonic sound may be found in patients with pronounced stenosis. Thus the suspicion of this disease is aroused by the characteristic systolic cardiac murmur in a noncyanotic individual. The suspicion is corroborated if the electrocardiogram shows right axis deviation, the absence of which does not exclude pulmonary stenosis. Finally, if the roentgenologic examination discloses a prominence of the second left cardiac arch and normal or faint vascular markings in the lungs or aplasia of the pulmonary conus, the diagnosis of pulmonary

stenosis is exceedingly probable. The diagnosis is established by cardiac catheterization. A distinct decrease of the systolic pressure on passage from the right ventricle into the pulmonary artery is characteristic. The right ventricular pressure is elevated. Furthermore, in all of the cases the arterial oxygen saturation was normal both at rest and during work. It is still not known how great a difference of pressure between the ventricle and the pulmonary artery is required to justify a diagnosis of pulmonary stenosis. The type of pressure changes when the catheter is withdrawn through the pulmonary ostium may serve to differentiate the three chief forms of pulmonary stenosis.—*Isolated pulmonary stenosis, H. Gøtzsche, P. Eskildsen, & A. T. Hansen, Acta med. Scandinav., 1951, 139: 481.*—(*K. T. Bird*)

Hemodynamics of Atelectasis.—Eight patients with atelectasis of a lobe or a lung were investigated. Arterial oxygen saturation was found to be within normal limits. Lobectomy or pneumonectomy was performed in 3 cases. Blood samples taken from the main pulmonary artery were uniformly darker than those obtained from the artery to the lobe or lung which was to be removed. Oxygen saturation studies confirmed this difference. These studies showed (*1*) that pulmonary arterial blood does not circulate within the diseased lung and (*2*) that there must be anastomoses between the bronchial and pulmonary arteries, thus explaining the presence of systemic blood in the pulmonary artery to the diseased part. —*Observations on the haemodynamics of pulmonary and lobar atelectasis, J. G. Gilroy, V. H. Wilson, & P. Marchand, Thorax, June, 1951, 6: 137.*—(*A. G. Cohen*)

Induced Asthma.—The great variability in clinical asthma makes it difficult to evaluate the results of therapy. The object of this study was to devise a simple method with which to induce and abort mild asthmatic attacks in humans. An apparatus was devised by which measured amounts of asthmogenic substances can be delivered. Attacks are easily terminated with isoprenaline. Attachments for spirometry, thoracography, and fluoroscopy are provided. Sensitivity to pollens and other substances can be tested in this manner more effectively than by skin tests. The effects of asthmogenic drugs, such as histamine and acetylcholine, can be determined. Desensitization can be carried out effectively. Finally, the effect of drugs upon induced asthma can be studied.—*Induced asthma in man, H. Herxheimer, Lancet, June 23, 1951, 1: 1357.*—(*A. G. Cohen*)

Fibrosis and Respiratory Function.—Fibrosis, even though extensive, may fail to cause any measurable evidence of altered respiratory function. In this regard the inadequacies of our methods of measurement must be borne in mind. Fibrosis may alter pulmonary function by (*1*) destroying or replacing tissue; (*2*) restricting movement of the respiratory apparatus; (*3*) impeding the flow of air through the bronchial passages; (*4*) impairing alveolar rinsing by reason of (*2*) and (*3*); (*5*) impeding the passage of oxygen and perhaps carbon dioxide across the barrier that separates the gas from the blood phase of the alveoli; and (*6*) causing abnormal patterns of breathing by reason of stimuli which arise directly from within the tissues of the diseased respiratory apparatus. Thus, all of the situations anticipated by *a priori* considerations are discoverable in actual fact except those which deal with alterations of the diffusion surface and the relationship of volume and speed of blood flow to alveolar size and ventilation. Techniques suitable for studying these latter relationships are as yet not reliable or have not been applied sufficiently to warrant comment. Reduction of maximum breathing capacity, abnormal patterns of respiration, and alterations of the arterial blood gases are the common manifestations of altered respiratory function associated with fibrosis of the respiratory system. In some instances these alterations appear clearly to be a result of the fibrosis, but in others the alterations have no apparent or discoverable causal relationship to the fibrosis. There is no specific pattern of

fibrosis which is invariably associated with or leads to a specific manifestation of altered respiratory function. This fact helps to explain the poor correlation which exists between the type and severity of the physiologic alteration and the coincident histologic or roentgenographic abnormality. From the standpoint of its influence on pulmonary function, fibrosis is relatively benign unless the physiologic alterations that characterize diffuse obstructive emphysema develop. The exception to this generalization is the relatively uncommon case of fibrosis in which the majority of the alveoli are involved by a thickening of the tissues that support the capillaries of the pulmonary artery. There is evidence suggesting that what might be termed histologic emphysema is not necessarily synonymous with physiologic emphysema. Specific disease of the lungs, for example, tuberculosis, Boeck's sarcoid, silicosis, or bronchiectasis, may or may not be accompanied by discoverable alterations of respiratory function. It is equally true that identical abnormalities of respiratory function may be associated with or caused by different diseases. The effectiveness with which pulmonary artery blood is shunted away from diseased and improperly functioning alveoli and channeled through properly functioning ones, thus preventing serious underventilation of the venous blood, has been demonstrated. The importance of this phenomenon has been inadequately appreciated (Author's summary).—*Pulmonary fibrosis and respiratory function, G. W. Wright & G. F. Filley, Am. J. Med., May, 1951, 10: 642.—(T. H. Noehren)*

Electrical Phrenic Stimulation in the Newborn.—Employing the method of Sarnoff and his colleagues, electrical stimulation of the phrenic nerve was carried out on 29 infants suffering from asphyxia neonatorum; 25 babies recovered. The only preparation prior to stimulation was clearance of the bronchial tree by catheter or by direct intubation. The current required to produce satisfactory diaphragmatic motion seemed directly proportional to the amount of anoxia present and was considerably greater than that required in the adult. Inhibition of spontaneous respiration, a phenomenon observed in adults, did not occur. This method of artificial respiration eliminates the risk of pulmonary emphysema or distention of the stomach which is present with positive-pressure methods and is worth further investigation in centers where there is an established routine for the treatment of neonatal asphyxia and where well-controlled studies can be undertaken.—*Asphyxia neonatorum treated by electrical stimulation of the phrenic nerve, K. W. Cross & P. W. Roberts, Brit. M. J., May 12, 1951, No. 4714: 1043.—(E. A. Riley)*

Lipoid Pneumonia in Lung Carcinoma.—A patient with anaplastic carcinoma of the lung received radiation therapy. Following a period of improvement, the patient became dyspneic and died. Necropsy showed no evidence of neoplasm. The sites of radiation were occupied by masses. On histologic study, the alveoli were found to be filled with granulation tissue which consisted mostly of macrophages which contained lipoid material. The lipoid was shown to be cholesterol ester. It is believed that the carcinomatous degeneration, hastened by irradiation, liberated the lipoid, a normal cell constituent, which in turn was phagocytised by macrophages. These lipoid-filled cells accumulated in the alveoli and caused pneumonia. Four consecutive cases of carcinoma of the lung which were not irradiated showed similar changes.—*Lipoid pneumonia (non-inhalation) in carcinoma of the lung treated by radiotherapy, S. J. De Navasquez, J. R. Trounce, & A. B. Wayle, Lancet, June 2, 1951, 1: 1951.—(A. G. Cohen)*

Solitary Pulmonary Necrosis.—Of all patients at the Jefferson Medical College Hospital from 1946 to 1950, whose roentgenograms showed a single nontuberculous encapsulated area of pulmonary radiotranslucency, 19 had single lung abscesses of inflammatory origin, 18 were proved to have malignant neoplasms with a single necrotic cavity. In patients more than 40 years of age, solitary

neoplastic necrosis was 1.5 times more common than benign nontuberculous abscess. Greater weight should be given, therefore, in the differential diagnosis to bronchogenic carcinoma, at least after the fourth decade. Several roentgen features emphasize the neoplastic origin of necrosis. In the smaller group, where an isolated cavity is distal to an obstructing endobronchial carcinoma, segmental or lobar atelectasis is present; atelectasis is rare with a benign abscess and when present is of minor degree. In the larger group, where the solitary cavity is actually an excavation in the neoplasm, the following criteria are suggestive of necrotic malignant neoplasm rather than simple lung abscess: (*1*) a well-circumscribed mass; (*2*) a centrally located cavity; (*3*) a thick, easily defined wall; (*4*) an irregular or actually nodular inner wall; (*5*) a lesion crossing or bulging into another lobe; (*6*) the absence of parenchymal inflammatory change elsewhere; and (*7*) the presence of metastases. Bronchoscopy with cytologic study of the secretions or saline washings can produce positive evidence of neoplastic cells in as high as 90 per cent of cases of carcinoma. In the few remaining unconfirmed cases, medical therapy should not be continued for more than three weeks in the absence of definite improvement before diagnostic thoracotomy is undertaken.—*Solitary pulmonary necrosis: A comparison of neoplastic and inflammatory conditions, R. Wigh & F. R. Gilmore, Radiology, May, 1951, 56: 708.*—(*W. J. Steininger*)

Lobar Agenesis.—Of 2 cases of lobar agenesis, one was proved by exploratory thoracotomy, and the other by necropsy. Parallel cases have not been recorded in the literature. It appears that the abnormality of bronchial development must occur between the 5 mm. and 7 mm. stages of the human embryo.—*Lobar agenesis of the lung, D. R. Morton, K. P. Klassen, & E. H. Baxter, J. Thoracic Surg., October, 1950, 20: 665.*—(*R. E. MacQuigg*)

Giant Cysts of Lung.—The response of giant pulmonary cysts to treatment depends upon the presence or absence of a lining of respiratory epithelium, but it is not possible to determine the presence or absence of an epithelial lining clinically. The results in 8 cases show that single large cysts of the lung should be treated by simple excision of the walls, closure of bronchiolar fistulas, and obliteration of the pleural space by re-expansion of the lung with catheter drainage and suction.—*Treatment of giant cysts of the lung, F. H. Allbritten, Jr. & J. Y. Templeton, III, J. Thoracic Surg., November, 1950, 20: 749.*—(*R. E. MacQuigg*)

Respiration and Circulation After Bilateral Lobectomy.—Of the 14 patients who have undergone bilateral lobectomy for bronchiectasis in Barnes Hospital since 1938, only one patient has died. No electrocardiographic evidence of right ventricular hypertrophy was found in any case. Although the remaining lobes expanded to occupy a nearly normal volume, the vital capacity of these lobes did not increase correspondingly. This was evident from the large size of the residual air compartment in all of the cases studied. Intrapulmonary mixing was normal in 7 of 10 patients as measured by the nitrogen content of the alveolar air after seven minutes of breathing pure oxygen. The large residual air compartment did not indicate that the remaining lobes were emphysematous; such a diagnosis was not corroborated by the clinical data or by roentgenography. The alveolar ventilation at rest was adequate to allow arterial oxygen saturation in all but one case; during exercise the saturation fell in most instances. In none of the patients was the maximum breathing capacity a limiting factor in the ventilatory demands made by exercise. The ventilation during exertion was apparently sufficient to prevent excessive accumulation of carbon dioxide. It can be concluded that ventilatory abnormalities were present in each of the patients studied and in all but 2 instances lead to deficient blood oxygenation either

at rest or during moderate exercise. In spite of this, all but 2 patients were able to lead useful lives and some of them performed moderately severe physical exercise.—*Respiratory and circulatory studies in patients after bilateral lobectomy, F. H. Taylor, A. Roos, & T. H. Burford, J. Thoracic Surg., December, 1950, 20: 974.*—(*R. E. MacQuigg*)

Surgery for Intractable Asthma.—From a group of approximately 300 asthmatic patients, 38 were operated upon because they were completely incapacitated and all conservative treatment had failed. There were 14 women and 24 men, 15 to 72 years of age. The left pulmonary plexus about the bronchus was destroyed and all branches of the vagus to the pulmonary hilum below the level of the recurrent laryngeal nerve were cut. The sheaths of the pulmonary artery and veins were removed so far as possible and the pulmonary ligament was divided. To prove that the anesthesia alone was not responsible for the result, 12 patients were subjected to Avertin-ether anesthesia for one to four hours without surgery; the longest respite from an asthmatic attack was 48 hours. Bronchoscopy alone gave relief for only a brief period. Of 32 patients subjected to left-sided denervation, 11 are free of asthma and 7 are definitely improved. In 7 the disease was unchanged and in one the asthma was worse. There was one death in which a right-sided spontaneous pneumothorax occurred on the second postoperative day. There were 6 late deaths after six to eighteen months, which is not surprising in view of the incidence of cor pulmonale and advanced emphysema in these patients. In the discussion, Ralph Adams stated that all of the 21 patients in whom he had made a follow-up after surgery were eventually failures. The cost of hospitalization for bilateral combined extensive symphathetic and parasympathetic denervations was slightly more than five hundred dollars per patient and, in the end, the patients had no more than a short term of symptomatic improvement.—*The surgical treatment of intractable asthma, B. Blades, E. J. Beattie, Jr., & W. S. Elias, J. Thoracic Surg., October, 1950, 20: 584.*—(*R. E. MacQuigg*)

Vagus Section for Bronchial Asthma.—In attempts to relieve intractable asthma, unilateral cervical sympathectomy, stellate ganglionectomy, bilateral cervical sympathectomy, unilateral cervicodorsal sympathectomy, and bilateral resection of the posterior pulmonary plexus have been used with debatable results. Vagus stimulation causes bronchoconstriction; sympathetic stimulation produces bronchodilation, but the rhythmic respiratory movements of the bronchi are passive and entirely due to the movements of the thoracic wall. The good results following unilateral or bilateral cervical sympathectomy have been variously explained. (*1*) Bronchial asthma in some instances may be due to a reflex initiated by irritation of the tracheobronchial tree; sympathectomy may interrupt the reflex arc on the afferent side. (*2*) The sympathetic nerves contain some bronchoconstricting fibers. Sympathectomy may diminish the number of bronchomotor impulses, decreasing bronchospasm, secretion, and edema. (*3*) Co Tui and associates demonstrated that the bronchi were more sensitive to adrenaline following cervicordorsal sympathectomy. The small amount of circulating adrenaline in sympathectomized patients may be sufficient to inhibit bronchospasm. In the present study, 3 patients were subjected to vagotomy; one patient believed herself cured, another died, and the remaining patient was slightly but definitely improved. Bronchospasm was demonstrable in all 3 by lipiodol installation after bilateral interruption of the "bronchomotor nerves." All three patients noted that cough decreased greatly following surgery, substantiating previous studies demonstrating that the cough reflex from stimulation of the homolateral bronchial tree was abolished following unilateral vagotomy performed above the origin of the pulmonary plexus. The ideal procedure may be bilateral transection of the vagus nerves immediately

below the origin of the recurrent laryngeal nerve. However, the severity of the gastrointestinal symptoms resulting from such a procedure does not justify its further application.—*A physiologic evaluation of vagus section for bronchial asthma, K. P. Klassen, D. R. Morton, & G. M. Curtis, J. Thoracic Surg., October, 1950, 20: 552.—(R. E. MacQuigg)*

Surgery for Bronchorrhea.—Two patients with severe idiopathic bronchorrhea treated by upper dorsal sympathectomy experienced marked relief.—*Therapeutic studies of pulmonary autonomic nerve surgery, O. A. Abbott, W. A. Hopkins, & P. H. Guilfoil, J. Thoracic Surg., October, 1950, 20: 571.—(R. E. MacQuigg)*

Complications of Sympathetic Nerve Blocks.—A series of 358 nerve blocks of the stellate and upper thoracic sympathetic ganglia in 218 patients showed that successful denervation is easily accomplished, but significant, undesirable sequelae occurred in 5.9 per cent of the blocks. Traumatic pneumothorax, accidental spinal anesthesia, and alcohol neuritis were the most common untoward events. The incidence of these complications was higher in posterior or lateral approaches to the sympathetic chain; the safest method for the cervical sympathetic was a paratracheal technique. Only 8 patients were treated by the posterior approach for stellate block. Stellate ganglion and thoracic sympathetic block should be employed without hesitancy when properly indicated, but adequate precautions must be observed to minimize the development of complications.—*The complications of stellate and thoracic sympathetic nerve blocks, L. R. Orkin, E. M. Papper, & E. A. Rovenstine, J. Thoracic Surg., December, 1950, 20: 911.—(R. E. MacQuigg)*

Surgery for Aortic Stenosis.—In extreme cases of aortic stenosis, the valve may be considered a rigid orifice surrounded by a calcified plaque, but fresh autopsy specimens frequently reveal that the cusps are flexible, especially near the aortic wall. An expansile dilator was devised by the authors for introduction through the right common carotid artery in the neck until it passes through the narrowed valvular orifice into the ventricle. The dilating mechanism could then be gently opened, gradually dilating the narrowed orifice to, or past the point of, commissural separation. This operation was performed on 2 persons with multivalvular lesions, one of which was severe aortic stenosis. Both patients withstood the procedure well. Repeated dilations may be necessary and seem feasible. In the discussion, A. E. Bloomberg showed a cardioscope which he was developing to permit operation in a region cleared of blood by a stream of fluid under great pressure. It takes approximately two and one-half minutes for 500 cc. of fluid to run through this cardioscope, but by using short bursts of fluid and removing blood from the femoral artery, survivals were obtained in dogs, some of which were operated upon two or three times.—*Experiences with the experimental surgical relief of aortic stenosis, C. P. Bailey, R. P. Glover, T. J. E. O'Neill, & H. P. R. Ramirez, J. Thoracic Surg., October, 1950, 20: 516.—(R. E. MacQuigg)*

War Wounds of the Chest.—In the management of 287 casualties from Korea suffering from thoracic injuries, only one death occurred; it was caused by agranulocytosis and was unrelated to operation. All but 4 (1.4 per cent), exclusive of the patient who died, have returned, or are expected to return, to full military duty. The application of principles employed in World War II has been further extended with excellent results; the emphasis now is on restoring further pulmonary function and minimizing chest deformity. Pulmonary decortication for traumatic hemothorax and secondary empyema with or without a persistent bronchopleural fistula, the use of antibiotics, and the employment of streptokinase and streptodermase have been largely responsible for the improved results. Pulmonary function studies, particularly external spirography and bronchospirometry, have been helpful in evaluating

surgical results and also in selecting patients for operation. Physiotherapy postoperatively is of extreme importance in the prevention of chest deformity and restoration of function. The cooperation of thoracic surgeon, internist, endoscopist, and physiatrist working as a team affords the best conditions for the management of patients with thoracic injuries. —*Recent experiences in the treatment of war wounds of the chest, H. A. Blake, S. P. Wise, III, V. S. Taylor, S. L. Kylar, R. C. Major, & J. H. Forsee, U. S. Armed Forces M. J., June, 1951, 2: 861.—(E. A. Riley)*

Alveolar-Cell Lung Tumors.—Seven cases of surgical resection for alveolar-cell tumor of the lung are added to the 51 cases reported in the literature before April 1949. From the gross appearance of the lesions in the 7 cases, the nodular form seemed to be primary, the nodules later coalescing to form a diffuse tumor. The symptomatology offered little of diagnostic significance, the chief symptom being dyspnea and cough. The incidence of alveolar-cell carcinoma was less than 3 per cent of all surgically excised pulmonary neoplasms. Most of the patients were in the fifth decade of life. Cytologic examination of sputum and bronchial washings provided the only positive preoperative diagnostic aid; the roentgenograms often simulated inflammatory or neoplastic disease. Surgical resection of the affected pulmonary region now is the only treatment of value. Without removal of the tumor, the patients die of asphyxia, mestastases, or obstructive pneumonitis. Although these tumors often show multicentricity, operation should not be denied them if only for palliation.—*Alveolar-cell tumors of the lung, E. R. Griffith, J. R. McDonald, & O. T. Clagett, J. Thoracic Surg., December, 1950, 20: 949.—(R. E. MacQuigg)*

Meigs' Syndrome.—Some 50 cases of ascites and hydrothorax in association with ovarian tumor have been reported. The ovarian tumor is usually a fibroma. The importance of recognizing the syndrome lies in two facts: (*a*) The condition is usually benign; (*b*) the ascites and hydrothorax clear up immediately following the removal of the tumor, and repeated aspiration is unnecessary. Two cases are reported. In the first the ovarian tumor was a cystadenocarcinoma of very low malignancy; and in the second, a pseudomucinous cystadenoma was found. In both cases the hydrothorax had cleared fourteen days after operation.—*Two cases of Meigs' syndrome, J. H. L. Conway-Hughes, Brit. J. Radiol., April, 1951, 24: 223.-(L. Hyde)*

Primary Diaphragmatic Neurofibrosarcoma.—Two cases of primary neurofibrosarcoma of the diaphragm are the first reported of such a tumor involving the diaphragm. Of 33 examples of all primary tumors of the diaphragm in the literature, 17 were considered benign and 18 malignant. The first patient remained well for four years after surgical removal and the second died suddenly before exploration could be performed. Of particular interest was the effect of surgery on the joint symptoms and clubbing of the fingers in the first patient. Most patients with intrathoracic tumors do not manifest hypertrophic pulmonary osteoarthropathy. Its presence in these 2 patients suggests that neither the anoxemia per se nor direct pressure on pulmonary vessels explains the syndrome. In the first case, large venous sinusoids connected the tumor with the pulmonary circulation. Most of the reduced hemoglobin from the tumor probably emptied into the pulmonary venous circulation and may have had the same effect as an intrapulmonary arteriovenous fistula. Patients with the latter lesion also frequently exhibit clubbing of the digits.—*Primary neurofibrosarcoma of the diaphragm, P. C. Samson & M. E. Childress, J. Thoracic Surg., December, 1950, 20: 901.—(R. E. MacQuigg)*

Intradiaphragmatic Cyst.—Two cases of mesothelial diaphragmatic cyst were discovered accidentally by radiography, and the tumors were removed surgically. Very few such cases have been reported. An opacity in

the region of the diaphragm calls for investigation. This should include gastrointestinal radiography and pneumoperitoneum. Ultimately, exploratory thoracotomy must be done.—*Intradiaphragmatic mesothelial cysts, G. Cruickshank & D. B. Cruickshank, Thorax, June, 1951, 6: 145.*—(*A. G. Cohen*)

Surgery for Eventration of Diaphragm.—Only 2 cases of successful operation for congenital eventration of the diaphragm have been reported and in both the lesion was on the right side. In the present case of left-sided hernia the anterior half of the diaphragm was composed of muscle; the posterior portion was a translucent membrane resembling pleura. The redundant diaphragm was plicated and turned backward to give three membranous layers in the posterior half of the new diaphragm. The child made an uneventful recovery, and one year after operation, which was performed on the ninth day of life, the diaphragm was found one interspace higher. —*A technique for the surgical treatment of congenital eventration of the diaphragm in infancy, W. L. Butsch & L. J. Leahy, J. Thoracic Surg., December, 1950, 20: 968.*—(*R. E. MacQuigg*)

Cervical Pulmonary Hernia.—A case of bilateral cervical hernia of the lung is of interest because of the rarity of cervical pulmonary hernia, because it is the second such bilateral hernia to be recorded, and because it was discovered on the forty-eighth day of life. The patient also had cleft lip and palate, and it is suggested that the herniated lung may be the result of a congenital defect.—*Cervical hernia of the lung, W. L. Palazzo & T. A. Garrett, Radiology, April, 1951, 56: 575.*—(*W. J. Steininger*)

Pneumomediastinum in the Newborn.—Pneumomediastinum in a newborn infant is a rare condition manifested by respiratory and circulatory distress. In all reported cases, some form of artificial respiration had been given. The diagnosis is roentgenographic, demanding anteroposterior and lateral films. Demonstration in the lateral film of air in the anterior mediastinum is pathognomonic of this condition. In the case described, recovery was uneventful.—*Pneumomediastinum in the newborn, E. J. Keeffe & C. F. Jones, Radiology, April, 1951, 56: 567.*—(*W. J. Steininger*)

Iodism After Bronchography.—Shortly after a bronchography, a patient developed a reaction typical of acute iodism. Despite treatment with sodium chloride, sodium thiosulphate, antihistamines, and penicillin, the patient died after two weeks. Necropsy showed changes of polyarteritis nodosa. A review of the literature revealed 12 reports of severe reactions, of which 4 were fatal. Most of the reactions were those of acute iodism. The clinical features were mainly limited to involvement of the skin and mucous membranes. Bronchopneumonia and nephritis were frequent complications. The changes appear within four hours to seventeen days. The prognosis appears to be unrelated to the interval before onset. Treatment should consist of (*1*) removal of iodine from the bronchi and stomach by posturing and aspiration, (*2*) administration of large doses of sodium chloride, and (*3*) chemotherapy against secondary infection. Neither the oral administration of potassium iodide nor a scratch test with iodized oil is a satisfactory test of iodine sensitivity. Two cases with severe reactions had had previous bronchography without reaction. —*Fatal acute iodism after bronchography, J. Sumner, A. I. Lichter, & E. Nassau, Thorax, June, 1951, 6: 193.*—(*A. G. Cohen*)

ANTIMICROBIAL THERAPY

Streptokinase for Tuberculous Meningitis.—In previous series of patients with tuberculous meningitis treated with streptomycin, 4 of 14 survived and, later, 11 of 21 survived. In the current series of 24 cases, the 12 patients of group A were given intrathecal streptomycin and streptokinase, while those in group B received streptomycin alone. Both groups received intramuscular streptomycin. Six units of streptokinase were dissolved in a solution

containing 25 to 75 mg. of streptomycin; this was given daily. After six to sixteen months, 7 of each group were alive. Complete spinal block developed in 4 cases in group A and in one case in group B; partial block developed in one case in each group. Thus, streptokinase failed to prevent block in 5 of 12 cases. Necropsy showed a basal exudate in 2 of 3 cases in group A and 4 of 5 in group B. In 3 cases, toxic reactions characterized by high cerebropsinal fluid white cell counts, pyrexia, and listlessness appeared; these disappeared during rest periods. In 2 cases, streptokinase alone gave the same reactions. It is concluded that streptokinase intrathecally is not beneficial in the treatment of tuberculous meningitis.—*Streptokinase as an adjunct in the treatment of tuberculous meningitis, J. Lorber, Lancet, June 23, 1951, 1: 1334.*—(*A. G. Cohen*)

Streptomycin for Meningitis.—The clinical course of tuberculous meningitis treated with streptomycin was studied in 106 cases. The protracted course of the disease during antibiotic therapy is characterized by the appearance of certain syndromes. Most of these syndromes are caused by vascular changes accompanying the chronic meningitis and are dependent on the localization of the process. Chronic spinal meningitis is responsible for transverse lesions of the spinal cord, including total paraplegia. If the meningeal process is localized around the chiasma opticum and the infundibulum, disturbances of the vision or of the pituitary functions may occur. Increased intracranial pressure may simulate the signs and symptoms of a tumor. Several cases of psychosis were also observed and were thought to be caused by cerebral edema.—*Zum klinischen Bild der mit Streptomycin behandelten Meningitis tuberculosa, P. Bünger & W. Geiger, Deutsche med. Wchnschr., November 24, 1950, No. 47: 1579.*—(*L. Molnar*)

Absorption of Streptomycin.—The four salts of streptomycin most generally used clinically, streptomycin calcium chloride complex and sulfate and dihydrostreptomycin hydrochloride and sulfate, were administered orally to mice, cats, and rats to study their relative absorption and toxicity. The trichlorides were found to have far greater acute oral toxicity for mice than the sulfates. In cats, ataxia was produced when large doses of streptomycin calcium chloride complex were administered orally. Blood levels approximated those obtained with one-twentieth as much given parenterally. In rats, much higher blood levels were obtained by oral administration of the trichlorides than with the sulfates. There was less gastric irritation with the salts of dihydrostreptomycin than with salts of streptomycin.—*Relative absorption of salts of streptomycin and dihydrostreptomycin after oral administration, A. O. Edison, S. Kuna, & F. T. Cuchie, Antibiotics, April, 1951, 1: 49.*—(*W. M. M. Kirby*)

Expanded Use of Chemotherapy.—A review of the use of streptomycin and *p*-aminosalicylic acid (PAS) at two sanatoriums in California has shown that such therapy is safer than was assumed and should be used earlier. Streptomycin resistance was not common even between 1947 and 1950; 16 per cent of 87 of these earlier patients had some degree of resistance in later cultures, only 6 per cent of 51 more recently treated patients had resistant strains. None of those with resistance had taken PAS with the streptomycin therapy. Among 17 patients given large doses of streptomycin averaging 163 gm., only 36 per cent of those cases later tested showed resistance. No resistance developed in 148 patients given streptomycin with PAS for six weeks to four months since January 1950. The drugs of choice currently are dihydrostreptomycin sulfate in doses of 0.5 gm. daily or 1.0 gm. twice a week and powdered or granular sodium PAS in doses of approximately 5 gm. thrice daily. The powder is less expensive; the granules are used in cases of gastric intolerance. A study of 40 cases with no visible cavitation, with occasionally positive bacterial studies, with or without collapse therapy, and with no change in status for four to six months showed a high percentage of healing after relatively

brief therapy. PAS alone was of value in two other series only when the lesions were small and bacilli scarce; it was of no use in cases with more necrosis. Sensitization to PAS occurred in 2.5 per cent of the cases; 4 recent cases were easily desensitized. Two larger groups of patients with cavitation had good healing when both drugs were used and especially when collapse therapy or resection was added early. The surgical removal of necrotic tissue is notably valuable. The presence of necrosis, inadequate dosage, and delay in collapse therapy, often due to optimism, were the causes of relapse.—*An expanded use of streptomycin and PAS, W. H. Oatway, Jr. & F. Reding, Arizona Med., May, 1951, 8: 26.*—(*W. H. Oatway, Jr.*)

Antibiotic Obstruction to Diagnosis.—In a small sanatorium in California 40 per cent of the patients were found, on February 1, 1951, to have had a delay of weeks to years in the diagnosis of their tuberculosis, due to the incautious use of chemotherapy. Their chest and lung symptoms had been treated with penicillin, chloromycetin, aureomycin, and terramycin, individually and in sequence. The presumed diagnosis usually contained the word 'virus'. Chest roentgenograms and bacterial studies were often not made; when made they were sometimes misinterpreted; and the presence of known tuberculous disease was no bar to such errors. Half of the patients eventually obtained a diagnosis because a large roentgenographic chest survey was being made in the community. Part of the blame for delay was the physicians', but the tuberculous patients were also at fault. Antibiotic advertisements often urge their early use and broad value; the effect may be misleading and dangerous. Easily available roentgenographic facilities seem more necessary than ever. —*Delays in the diagnosis of tuberculosis from the incautious use of antibiotics, W. H. Oatway, Jr., Arizona Med., July, 1951, 8: 25.*—(*W. H. Oatway, Jr.*)

LABORATORY STUDIES

Pulmonary Artery Ligation in Experimental Tuberculosis.—In 23 monkeys, tuberculosis was induced by the intravenous injection of human tubercle bacilli. In 7 of 8 monkeys with interruption of the pulmonary arterial blood supply to an entire lung, extensive caseous tuberculosis resulted in that lung in contrast to the scattered miliary lesions in the opposite lung. Similarly, when the pulmonary artery to a single lobe was ligated, an extensive caseous process developed in that lobe in 6 of 8 animals. In contrast, scattered miliary lesions were found in all other lobes on both sides. In 7 monkeys with induced tuberculosis submitted to simple thoracotomy, the tuberculous process was uniformly miliary with no difference between the lung on the side of the operation and the opposite lung.—*Experimental tuberculosis: II. Effects of ligation of pulmonary arteries on tuberculosis in monkeys, H. W. Scott, Jr., C. R. Hanlon, & B. J. Olson, J. Thoracic Surg., November, 1950, 20: 761.*—(*R. E. MacQuigg*)

Mass Spectrometry During Anesthesia.—A continuously recording portable mass spectrometer has been developed for use as a rapid, recording gas analyzer in the operating room and physiological laboratory. This electronic device is capable of quantitatively analyzing a mixture of 5 gases at twenty-second intervals with an accuracy within 1 per cent. The presence of anesthetic gases introduces no measurable error. In use, the patient, following intratracheal intubation, was connected to the mass spectrometer by a small-bore polyethylene catheter passed through the intratracheal tube to the carina. A small blower reduced the lag time between the patient and spectrometer to approximately ninety seconds. Prior to each test, the spectrometer was calibrated against a gas of known composition; at hourly intervals during the procedure, it was rechecked for drifting; and rarely was any significant variation detected. The toxicity of high alveolar car-

bon dioxide concentrations probably depends chiefly upon the acidosis produced; hence, the carbon dioxide values were correlated with simultaneous pH levels of blood obtained from an exposed artery or from the radial artery. A rise in blood pressure commonly has been accepted as signaling the appearance of carbon dioxide excess. During major surgical procedures many variables interfere with the blood pressure, and it is extremely unreliable as a diagnostic sign of hypercapnia. In only a few instances was there a rise in blood pressure coincident with carbon dioxide elevation. While carbon dioxide excess in the ranges observed is normally a marked respiratory stimulant, the anesthetic agents so effectively interfered with the function of the respiratory center that an increase in respiratory rate or volume was seldom noticed in conjunction with high carbon dioxide levels. The decreased tolerance to pentothal and nembutal in the presence of respiratory acidosis was confirmed. The instrument was used to test quantitatively the concentration of exhaled gases during 34 major procedures including many transthoracic procedures. On the average, a level of 6.8 per cent carbon dioxide was reached at one time during most of these cases. This corresponds to an arterial blood pH of 7.2 and an alveolar carbon dioxide concentration of approximately 10 per cent.—*The development of, and certain clinical applications for, a portable mass spectrometer, F. A. Miller, A. Hemingway, A. O. Nier, R. T. Knight, E. B. Brown, Jr., & R. L. Varco, J. Thoracic Surg., November, 1950, 20: 689.*—(*R. E. MacQuigg*)

Persistence of Beryllium in Lungs.—It has been presumed that the persistence of beryllium compounds deposited in the lungs was responsible for those cases in which the onset of berylliosis was delayed beyond the period of exposure. Accordingly, a procedure was devised to permit observation of the rate at which beryllium oxide dust could accumulate in the lungs of rats breathing an atmosphere containing such a dust. A second study was made to determine the rate at which beryllium leaves the lungs after exposure is terminated. In the lungs of these rats the concentration of beryllium oxide dust tended to increase gradually during the period of exposure. The lungs of individual animals showed wide variation in the concentrations of beryllium as these became greater. The beryllium oxide retained in the lung tissues after a total of thirty-five hours of exposure on seven days remained fairly constant for a number of months after the cessation of exposure. Beryllium concentrations several times those in the lungs of persons dying of chronic pulmonary berylliosis were found in rats' lungs as long as 582 days after their last exposure. The concentrations of beryllium in organs other than the lungs varied considerably in different animals but were always much lower than those in the lungs. Redistribution of beryllium from the lungs to other tissues seems to have been only a slight factor in lowering the concentration within the lungs; if appreciable amounts of beryllium were removed by the blood from the lungs, the mobilized material must have been eliminated promptly in large part. Beryllium oxide may also have been eliminated from the lungs of the rats through the trachea, as has been shown to occur with particles of other dusts. No attempt was made to estimate the amounts which may have been removed in this way. The dust produced a reaction in the lungs of rats within as little as seven days following the onset of exposure. This was not a specific reaction but consisted at first of irritation of the septal cells, with the latter becoming free intra-alveolar phagocytes which engulfed the dust particles. The phagocytic cells then tended to congregate within a few alveoli, after which there was a tendency toward fibrosis in the septal walls adjacent to the alveoli which contained the dust-laden cells. Granulomatous lesions did not develop in the lungs of the exposed rats during a period of 582 days following exposure.—*Persistence of beryllium oxide in lungs after inhalation of dust, F. R. Dutra, E. J. Largent, J. Cholak,*

D. M. Hubbard, & J. L. Roth, A. M. A. Arch. Indust. Hyg. & Occup. Med., July, 1951, 4: 66.—(T. H. Noehren)

Beryllium Poisoning.—Aurin tricarboxylic acid, a dye, given intravenously to mice or rats will protect against acute beryllium poisoning as a result of intravenous beryllium. Since there is evidence that the toxicity is due to ionized beryllium, it is believed that this dye protects by forming an insoluble lake. The protection is such that the fourteen-day LD_{50} could be increased from 7 to 90 per cent. The drug may be given fifty-two hours before, or twelve hours after, the beryllium. It is ineffective when given orally. These studies relate only to acute beryllium intoxication.—*Protection against experimental beryllium poisoning by aurin tricarboxylic acid, M. White, A. Finkel, & J. Schubert, J. Pharmacol. & Exper. Therap., June, 1951, 102: 88.—(S. Hadley)*

Burns Valve for Dog Surgery.—The Burns valve, developed during the last war as a respirator, has been adopted for anesthesia during intrathoracic surgery in the dog and cat. Use of the valve eliminated the need for an anesthetic attendant, and no dog died on the table while the valve was in use. In experiments using compressed air, the carbon dioxide tension tended to decrease; using pure oxygen, 2 dogs showed a tendency to develop an abnormally high carbon dioxide tension. In the discussion, C. Crafoord stated that mechanical control of respiration as soon as the chest is opened gave the best results as to arterial oxygen tension, carbon dioxide, and pH values. Mechanically controlled respiration was used by him in several thousand clinical cases, with no complications.—*Use of the Burns valve as a simple respirator for intrathoracic surgery in the dog, J. T. Dameron & D. G. Greene, J. Thoracic Surg., November, 1950, 20: 706.—(R. E. MacQuigg)*

PUBLIC HEALTH AND EPIDEMIOLOGY

Standardization of Histoplasmin.—Because the supply of standard histoplasmin, H-15, employed by the Division of Tuberculosis was exhausted, it was necessary to standardize a new preparation. Several lots were tested; the one selected for general use was H-42. This has a matching dilution of 8:1,000 when compared with 1:1,000 of the old standard. The Eli Lilly Company product dilution of 1:100 compares with 1:1,000 of H-15.—*Biological assay of lots of histoplasmin and the selection of a new working lot, L. Shaw, A. Howell, & E. Weiss, Pub. Health Rep., May 5, 1950, 65: 583.—(S. Hadley)*

Fungus Sensitivity in Norway.—In an attempt to ascertain whether cutaneous sensitivity to histoplasmin exists in Norway, a total of 1,074 persons were skin-tested with histoplasmin and coccidioidin antigen solution. A test dose of 0.1 ml. of a 1:100 solution of each was injected intracutaneously. The skin reaction was considered positive if the induration measured 10 mm. or more in diameter, regardless of erythema, after forty-eight hours. Twenty-seven persons reacted to histoplasmin alone and 3 to coccidioidin alone; one of these had lived in California. Twenty-three persons reacted to both histoplasmin and coccidioidin. None of the positive reactors showed any sign of pulmonary disease or other disease associated with a mycotic infection. The relatively large number of persons giving a positive reaction to both antigens indicates cross-reactions due to systemic infections with one or more fungi immunologically closely related, possibly *Geotrichum*. It is believed that some of the positive reactions to histoplasmin were caused by past or present infections with *Histoplasma capsulatum*. Since practically all of the persons tested were tuberculin positive, no conclusions could be drawn regarding pulmonary calcification.—*Histoplasmin and coccidioidin sensitivity in Norway, J. Böe, V. Lindén, & J. Tveit, Acta med. Scandinav., 1951, 139: 196.—(K. T. Bird)*

Asymptomatic Tuberculosis.—Of 859 patients discovered to be tuberculous by routine roentgenograms of the chest, 50 per cent were

asymptomatic; 36.3 per cent were classified as minimal; whereas only 16.7 per cent of those hospitalized on the basis of symptoms were so classified. Of the patients discovered by routine roentgenograms, 50 per cent had symptoms which were not recognized by them as significant. Of those recognized by routine roentgenograms, asymptomatic patients constituted 60.2 per cent of the minimal cases; 46.9 per cent of the moderately advanced; and 33 per cent of the far advanced. The symptoms manifested by the patients conformed to the expectations of current opinion. Public health programs directed to discovery of unrecognized tuberculosis should be continued and expanded. The lay public requires further education in the significance of symptoms (Authors' summary).—*Asymptomatic active pulmonary tuberculosis, G. A. Cronk, D. Lufkin, & T. L. Ryan, U. S. Armed Forces M.J., June, 1951, 2: 887.—(E. A. Riley)*

Jelly Tuberculin Skin Testing.—Results reported suggest that, when properly used, the OT jelly skin-testing has many advantages over the standard intradermal Mantoux test. The test is of an accuracy comparable with the Mantoux test in lower dilutions, is cheaper, simpler, less wasteful of materials, and avoids the psychic trauma attendant upon an intradermal injection.—*Technique of jelly (tuberculin) skin-testing, J. D. Lendrum, Brit. M.J., July 21, 1951, No. 4724: 148.—(E. A. Riley)*

BCG and Pregnancy.—Ten BCG vaccinations were performed in pregnant women 19 to 29 years of age, mostly during a prenatal examination. BCG was administered at all stages of the pregnancy. No ill effects were observed. There were no abortions and the pregnancy was normal. Tuberculin allergy developed two months later. All children were in good condition at birth and showed a negative reaction to tuberculin. Subsequently they also were vaccinated with BCG; their tuberculin reaction converted after the usual time interval of two months.—*BCG at grossesse, M. Fourestier, G. Bainette, L. Bergman, & E. de Saint-Germain, Rev. de la tuberc., 1951, 15: 278.—(V. Leites)*

Periodic Surveys.—There is a decline in the yield of roentgenographic surveys repeated at periodic intervals within the same collectivity. After the second year the yield is only one-third of the initial one; it falls to one-fourth at the fourth re-examination, one-fifth at the fifth, and one-eighth at the seventh. At this point the absolute yield becomes insignificant. The decline of the yield after the second examination is influenced by the time interval separating the two surveys. The yield of biannual surveys is hardly superior to that of annual surveys. A notable increase in newly diagnosed cases is observed at intervals of three to four years. It is difficult to establish the optimal interval for periodic re-examination. The vast majority of cases of tuberculosis with acute or subacute onset would inevitably be overlooked in mass surveys unless these were repeated at intervals of two to three months, which is of course impracticable. Biannual community surveys are sufficient to assure the finding of latent forms which have developed in the interval. In France today, 15 per cent of all tuberculous cases requiring hospital or sanatorium care have been diagnosed on a roentgenographic survey. This comprises truly latent forms and symptomatic but neglected cases. In a given community the repetition of surveys has not been found to decrease notably the number of cases found intercurrently and "spontaneously" during the first three years. During the fourth year, however, there has been a decrease of 30 per cent in the number of intercurrently diagnosed cases.—*À propos du dépistage radiologique itératif de la tuberculose pulmonaire, M. Bariéty & C. Coury, Rev. de la tuberc., 1951, 15: 18.—(V. Leites)*

Mass Radiography.—A mass radiographic survey of civil servants carried out in London in the years 1946 to 1949 indicated a high attack and death rate from tuberculosis for females in young adult life, with a fall to low levels in later life. Among males, however,

the highest attack rate occurred in young adults, but the maximum death rate occurred late in life. Results showed a considerable pool of inactive or doubtfully active cases among older males, and it is suggested that this high mortality rate among older males results from the breakdown of quiescent lesions probably present for many years and acquired without symptoms in young adult life. During repeat mass radiographic examinations, the highest incidence of new lesions was found in young adults of both sexes, with few cases found in older males and practically none in older females. When repeat examinations are possible, attention should be directed towards young adults since the possibility of persons over the age of 35 years with a normal radiograph developing tuberculosis is relatively small.—*Results of re-examination by mass radiography, V. H. Springett, Brit. M.J., July 21, 1951, No. 4724: 144.*—(*E. A. Riley*)

Health and Air Pollution.—Within the limits of this survey the data show that the frequency of the common cold was significantly greater in a high dustfall area than in a low dustfall area and that this variation was not due to differences in socioeconomic status, age, sex, or occupation.—*Health and air pollution, H. Heimann, W. F. Reindollar, H. P. Brinton, & R. Sitgreaves, A. M. A. Arch. Industr. Hyg. & Occup. Med., April, 1951, 3: 399.*—(*T. H. Noehren*)

Pneumoconiosis.—Pneumoconiosis is an acute or chronic pulmonary disease attributable to many different kinds of dust. Of 1,247 lungs submitted to the author for examination, 42 were deleted because of insufficient data, leaving 1,205 cases for analysis. The individuals had been employed in various industries and had been exposed to a great variety of dusts. The lungs of 1,036 showed evidence of pneumoconiosis, while 169 did not. Of the former, 796 showed silicosis with or without other forms of pneumoconiosis, while 240 showed other forms (50.4 per cent asbestosis). Active tuberculosis was found in 43 per cent, including 58.6 per cent of the silicosis cases and 32 per cent of the other forms. The highest incidence of tuberculosis was noted in sandblasters, with iron and foundry workers next. There were 80 cases of primary neoplasms of the lung, including 6.9 per cent of the silicosis group, 17 per cent of the asbestosis, and 8 per cent of the other forms. In 21 per cent of the silicosis cases, the lesions were seen only by microscopic examination. In industry, exposure generally is to mixed dusts containing particles of various sizes. The resultant pathologic changes, therefore, usually are varied.—*Pneumoconiosis, S. R. Gloyne, Lancet, April 14, 1951, 1: 810.*—(*A. G. Cohen*)

THE AMERICAN REVIEW OF TUBERCULOSIS ABSTRACTS

Edited by LAWRENCE B. HOBSON

VOLUME 65 FEBRUARY, 1952 ABST. No. 2

CLINICAL STUDIES. TUBERCULOSIS

Primary Tuberculosis.—Bronchoscopy was performed in 96 children with active primary tuberculosis and lobar or segmental densities. Congestion of the mucosa of the stem bronchus was found in 86 cases; in 10, the bronchial mucosa appeared infiltrated. In 25 cases, bronchoscopy revealed extrinsic compression of the bronchus, almost always accompanied by inflammation of the bronchial wall. In 30 cases there was definite evidence of a bronchial fistula with erosion of a tuberculous node. In more than 30 per cent of the cases, bronchial stenosis was present. This was due to extrinsic pressure in one case, to congestive and infiltrative changes in the bronchial wall in 16 cases, to a combination of intrinsic and extrinsic factors in 15 cases, and to a granulating fistula in 5 cases. Repeated bronchoscopic examinations showed that eighteen months after the onset of primary infection there was rarely complete clearing of the endobronchial pathology. A total of 139 cases of lobar or segmental density in primary tuberculosis was observed. The upper lobes were affected in 83 per cent of cases, in contrast with the more frequent localization of the primary foci in the lower lobes. Densities of this type were, therefore, pathogenetically independent of the primary focus and could not be called perifocal "epituberculosis". These densities, on the other hand, were in close topographic and pathogenetic relation to involved mediastinal nodes, the interbronchial nodes adjacent to the right upper lobe bronchus receiving the lymphatic drainage of the entire right lung. These nodes as well as those surrounding the origin of the middle lobe bronchus were predominantly involved in primary tuberculosis. Thus, most homogeneous shadows in primary tuberculosis were a direct consequence of the "tuberculous disease of the hilum", adenopathy, peri-adenopathy, bronchial, and peribronchial lesions, and involvement of nerves and vessels of this area. The homogeneous densities were mainly atelectatic in nature. Absence, in the early stages, of signs of retraction may have been due to progressive and incomplete bronchial narrowing with slow absorption of air; edema then replaced the air. The subsequent course was variable. In one third of 80 cases with a long observation period, the density cleared completely; in another third there was slow retraction and the change was irreversible. With the right upper lobe, pleural adhesions sometimes caused the retracted area to appear as a right paratracheal opacity which could be mistaken for residual adenopathy. The nature of the residual shadows was questionable in the remaining third of cases. The chronicity of these atelectatic shadows reflected the chronicity of tuberculous adenopathy and of the endobronchial pathology. Neither streptomycin nor *p*-aminosalicylic acid benefited these conditions. In some cases bronchoscopy with aspiration of secretions, application of novocaine and adrenaline, and removal of granulation tissue were helpful.—*Les condensations lobaires et ségmentaires de la primo-infection tuberculeuse de l'enfant, données bronchoscopiques; essai d'interprétation radiologique et pathogénique, M. Jeune, P. Mounier-Kuhn, M. Béthenod, & F. Potton, Semaine d. hôp. Paris, May 2, 1951, 27: 1414.*—(*V. Leites*)

Bronchiectasis in Primary Tuberculosis.—Bronchography was performed in 47 cases of active primary tuberculosis. Of these, 26 gave bronchoscopic evidence of bronchial fistula with erosion of a tuberculous node. Among the 26 patients with bronchial fistula, 20 (77 per cent) had bronchiectasis; among patients without bronchial fistula, the incidence of bronchiectasis was 47 per cent. The bronchi-

ectatic changes were always unilateral. In 20 of the 30 cases, one lobe was involved; 2 or 3 lobes of one lung were affected in 8 cases. Bronchiectasis was found in descending order of frequency in the right upper lobe (11 cases), right middle lobe (10 cases), left upper lobe except lingula (7 cases), lingula (5 cases), right lower lobe (5 cases), and left lower lobe (2 cases). The anterior segments were more frequently involved. Bronchiectasis in primary tuberculosis affected mostly the bronchi of larger caliber, the maximum dilatation being near the hilum and the abnormality diminishing towards the periphery. Cylindrical bronchiectasis was found in 22 cases; in 5 cases the dilatation was moniliform, and in 3 it was saccular. Bronchiectasis in childhood is usually without clinical manifestations, and roentgenography without lipiodol instillation is not characteristic. There was consolidation with retraction in 20 cases, without retraction in 3 cases; linear shadows in a previously consolidated area were seen in 7 cases, thickening of the interlobar fissure in 3 cases. The pathogenesis is uncertain. Bronchial stenosis and its mechanical consequences, tuberculous endo- and peri-bronchitis, fistula of the bronchial wall, and bronchogenic dissemination, are contributing factors. The bronchiectatic changes are irreversible but they can remain latent indefinitely. Some cases, especially those with involvement of the middle and lower lobe, develop the usual clinical symptoms of bronchiectasis at a much later date. Only exceptionally does positive sputum occur. These possibilities do not justify prophylactic surgery which would be particularly difficult in the presence of the hilar node involvement. —*Les bronchiectasies consécutives a la tuberculose de primo-infection chez l'enfant: A propos de 30 observations personelles, M. Jeune, C. Beraud, P. Mounier-Kuhn, & J. Normand, Semaine d. hôp. Paris, May 2, 1951, 27: 1443.*—(*V. Leites*)

Bronchiectasis and Tuberculous Bronchitis. —All of 222 consecutive patients with active pulmonary tuberculosis were bronchoscoped at least once and all had bronchography. The group consisted of 96 men and 126 women, and their ages ranged from fourteen to sixty-seven years. The duration of disease varied from a few months to twenty years, in the majority up to five years. At the time of bronchography 26 were classified as having minimal, 74 moderately advanced, and 122 far advanced pulmonary tuberculosis. In 115 patients bronchiectasis was demonstrated by bronchography, 97 with unilateral and 18 with bilateral changes. Blockage of a common bronchus was demonstrated in 4 patients and tracheal stenosis due to tuberculosis was found in one patient. All segments of pulmonary tissue were involved with bronchiectasis with equal frequency when the incidence was based upon the relationship of bronchiectasis to the anatomic location of the parenchymal process. All types of collapse therapy were considered, both in the presence and absence of bronchiectasis. In this group of cases previous collapse therapy did not appear to influence the subsequent development of bronchiectasis. Twenty patients were found to have demonstrable tuberculous involvement of the tracheobronchial tree by bronchoscopy. Of the 222 patients, 81 had 82 operations for removal of lung tissue in the treatment of their tuberculosis. Of the 82 surgical specimens examined, 60 were diagnosed preoperatively as demonstrating bronchiectasis by bronchography. The surgical specimens were obtained from 24 pneumonectomies and 58 lobectomies and segmental resections. A review of the surgical specimens revealed a diagnosis of chronic nonspecific bronchitis in 17 specimens; tuberculous bronchitis in 36; nonspecific bronchiectasis in 42; and tuberculous bronchiectasis in 2 specimens. Tuberculous bronchitis without bronchiectasis occurred in 14; bronchiectasis in the absence of tuberculous bronchitis in 21; and bronchiectasis with endobronchial tuberculosis in 21 specimens. It is apparent that during routine bronchoscopy of tuberculous patients approximately 15 per cent or less will have demonstrable evidence of tuberculous bronchitis. However, histopathologic examination of surgical specimens reveals that approximately 50 per cent are involved with

tuberculous endobronchitis. In this series of cases bronchiectasis was diagnosed preoperatively in 73 per cent of the surgical specimens but was confirmed by histopathologic examination in only 54 per cent. This discrepancy is explained on the following bases: overreading of bronchograms; minimal bronchiectasis being missed in the gross examination; small cavities filled with contrast media being interpreted as bronchiectasis; and, most frequently, distortion of the bronchi secondary to tuberculous bronchitis being diagnosed as bronchiectasis.—*Bronchiectasis and tuberculous bronchitis, M. G. Buckles, Tuberculology, March, 1951, 12: 146.—(L. Levin)*

Pulmonary Arteries in Bronchiectasis.—Dormer and associates, who have done bronchograms on more than 2,000 patients with tuberculosis, report that bronchiectasis is common, often overshadows the active tuberculosis, and renders collapse ineffective. Norris and Landis found bronchiectasis in more than 21 per cent of autopsied tuberculous lungs. Injection of the pulmonary arteries with iodized oil in cases of nontuberculous bronchiectasis reveals a normal pattern and suggests that the arteries are intact. Resection of a bronchiectatic lung is followed by an increase in the arterial oxygen saturation. This is attributed to the removal of poorly ventilated but adequately circulated lung which is acting as a venous-arterial shunt. In fibrocaseous tuberculosis there is invariably an obliterative arteritis. The large branches are irregular; there are few small branches in fibrotic areas and none in areas of caseation. This explains the finding of normal arterial oxygen saturation in pulmonary tuberculosis patients at rest, despite the loss of considerable pulmonary tissue.—*The pulmonary artery in bronchiectasis, W. G. Gobbel, Jr., J. Gordon, & G. J. Digman, J. Thoracic Surg., April, 1951, 21: 385.—(R. E. MacQuigg)*

Tuberculous Pericarditis.—Five patients with proved tuberculous pericarditis, active at the time of operation, were treated by radical pericardiectomy. All operative areas healed without complications, despite the presence in the pericardium of tubercle bacilli. The operation resulted in a complete cure in 3 patients and in progressive improvement in the others. It is recommended that cardiac decompression be done when the diagnosis of cardiac compression can be made clinically, either in the stage of pericardial effusion or in the stage of pericardial contracture. In a very ill patient with tuberculous pericardial effusion, decompression can best be effected by removal of the left sixth costal cartilage followed ten to twenty days later by median sternotomy and complete anterior pericardiectomy.—*Treatment of active tuberculous pericarditis by pericardiectomy, E. Holman & F. Willett, J.A.M.A., May 5, 1951, 146: 1.—(H. Abeles)*

Ischio-Rectal Abscess with Primary Complex.—A five-month-old infant, who had coughed since the first month of life, developed a boil on the left anal margin. The Mantoux reaction, 1:10,000, was positive; the sedimentation rate was 37 mm.; the leukocyte count, 15,000. A punch biopsy from the ulcer edge showed numerous giant cells and moderate numbers of acid-fast bacilli within these cells. A chest radiogram showed a right middle lobe collapse which at bronchoscopy was found to be due to compression of the middle lobe orifice from without. The carina was flattened, but no endobronchial lesion was seen. The literature reports only 2 cases in patients fifteen years of age or younger in whom rectal ulceration was a complication of open pulmonary tuberculosis. No reference could be found to patients with a primary pulmonary tuberculous focus, that is, a "closed" focus, who had a tuberculous ischio-rectal lesion.—*Tuberculous ischio-rectal abscess and primary pulmonary tuberculous complex in a five-month-old infant, B. Gans, Arch. Dis. Childhood, February, 1951, 26: 84.—(L. Levin)*

Tuberculosis and Hemolytic Icterus.—A 42-year-old man, who since the age of 20 had suffered from attacks of familial hemolytic jaundice, developed pulmonary tuberculosis

with cavitation. He was given pneumothorax treatment. Jaundice developed whenever larger pneumothorax refills were given. The occurrence of tuberculosis in the presence of familial hemolytic jaundice seems to be very rare.—*Ein Fall von Lungentuberkulose bei familiärem hamolytischen Ikterus, W. Danzer, Wien. klin. Wchnschr., June 29, 1951, 63: 475.*—*(G. C. Leiner)*

Costa's Reaction in Tuberculosis.—The test described by Costa is based on the change of the albumin-globulin quotient. More than 350 tests were done in 130 patients with pulmonary tuberculosis. The results usually paralleled the erythrocyte sedimentation reaction. In approximately 10 per cent of the cases there was a difference between the two tests; the Costa reaction seemed to correspond more closely with the clinical course. In 10 cases of uncomplicated pregnancy, the Costa reaction remained normal.—*Ueber die Reaktion nach Costa bei Lungentuberkulose, E. Albrecht, Wien. klin. Wchnschr., July 13, 1951, 63: 511.*—*(G. C. Leiner)*

Cortisone and Tuberculin.—It has been shown that injections of cortisone or ACTH, prior to the injection of tuberculin into the skin, will suppress the reaction in sensitized animals and man. A series of 9 sensitive persons has been injected intracutaneously with a mixture of cortisone and OT.; the tuberculin reactions were diminished in all cases, with induration being more reduced than erythema. A similar local use of ACTH had no effect. Cortisone alone caused a transient immediate erythema. Biopsies showed that the addition of cortisone caused a decrease of the usual lymphocytic infiltration. Pruritis from tuberculin was eliminated with the addition of cortisone. A "rebound" tuberculin reaction occurred after the fifth day in 3 cases. Local cortisone decreased the skin reactions to diptheria toxin in 5 individuals but one had a "rebound" reaction. It is concluded that local cortisone decreases tissue responses in general, but it remains to be seen whether there is an additional interference with antigen-antibody reactions.—*The local effect of cortisone on the tuberculin reaction, H. Vollmer, J. Pediat., July, 1951, 39: 22.*—*(W. H. Oatway, Jr.)*

Dermal Grafts for Healed Tuberculous Stenosis.—Wire-enforced dermal grafts were used in 11 patients to correct severe, healed tuberculous bronchial or tracheal stenosis, salvaging healed or disease-free lung tissue. Complications, such as partial separation of the graft from the bronchus and recurrent tuberculous infection, can occur. In the discussion, F. J. Jarvis presented the case of a 33-year-old man who had an adenocarcinoma of the trachea. After removal of 4 cm. of the trachea it was replaced by a stainless steel tube. The tube was clean when removed one year later. The regenerated trachea could not withstand the strain of coughing, and the tube was replaced. The patient died with generalized pulmonary and pleural metastases thirty-three months after initial operation.—*Further experiences with dermal grafts for healed tuberculous stenosis of the bronchi and trachea, P. W. Gebauer, J. Thoracic Surg., October, 1950, 20: 628.*—*(R. E. MacQuigg)*

Streptokinase-Streptodornase for Empyema.—Streptococcal concentrates were used to treat chronic empyema in 10 patients, 9 of whom had pulmonary tuberculosis. The bacteria which were considered secondary invaders were, in most instances, eradicated. The action of the streptococcal products occurs at the surface; rapid sterilization and healing indicate that the infection was relatively superficial at the time of treatment. Fixed foreign substances, such as dead tissue or sutures, caused refractoriness, and their removal has eradicated the disease. Even bacteria which were resistant to several antibiotics were eliminated by the inherent antibacterial qualities of the tissues. Patients whose empyema fluid repeatedly contained tubercle bacilli had negative cultures of the fluid after treatment. Release of tubercle bacilli imbedded in the tissues has not been followed by a demonstrable spread of the infection but this com-

plication might occur. In patients who originally had chronic tuberculous empyema, previously existing bronchopleural fistulas reopened following treatment but in some the fistulas closed again. The special advantages of streptokinase-streptodornase are best used before the empyema becomes more chronic and hence more difficult to treat.—*The use of streptokinase-streptodornase in the treatment of chronic empyema, W. S. Tillett, S. Sherry, & C. T. Read, J. Thoracic Surg., April, 1951, 21: 325.—(R. E. MacQuigg)*

Decortication for Empyema.—Delorme performed decortication of the lung for empyema in 1894, and modifications of his technique are still used. The Delorme operation is an incomplete procedure because it does not remove the pathologic pleura covering the thoracic wall, the diaphragm, and certain parts of the mediastinum. Since May 1948, the authors have removed the entire pleura, both parietal and parenchymal, in order to obtain complete re-expansion of the lung. Much of the pleura was removed by cleaving the underlying muscular fibers with the fingers to prevent tearing of the lung and other injuries. Of the 44 cases of chronic purulent pleurisy reported, 28 were cases of tuberculous empyema. Of these 28 tuberculous empyemas, 23 were apparent cures. There were 3 deaths, one while the patient was still in the surgical ward. The operation is indicated only when pulmonary lesions are absent or sufficiently inactive to permit surgical intervention. In some cases in which the underlying lung tissue contains active or potentially active lesions, successful decortication may follow a preliminary thoracoplasty or lobectomy.—*Techniques et résultats de la libération pulmonaire dans le traitement des pleurésies purulentes chroniques, H. Métras, M. Warnery, M. Grégoire, & J. Corolleur, Poumon, May, 1951, 7: 265.—(A. T. Laird)*

Pneumonolysis for Opaque Lobes.—In a series of more than 300 cases of closed pneumonolysis, 57 cases of opaque lobes were found and studied. Bronchial obstruction, pneumonitis, and active contraction of the alveoli have all been proposed to explain opaque lobes; none can be accepted as the single cause. Roentgenography and thoracoscopy show two main types of opaque lobes in pneumothorax: the flabby, wrinkled, bluish, triangular lobe; and the tense, rounded, shiny, grayish, densely opaque one. This distinction is paramount because the prognosis is different. In the first group, adhesions should be sectioned so as to free the lung from the surrounding mobile structures, without any attempt to divide all the adhesions. An opaque lobe suspended from the upper mediastinum is quite compatible with a satisfactory result. If there are diaphragmatic adhesions, phrenic nerve paralysis may be added to relieve longitudinal tension. As soon as cavity closure has been attained, the remainder of the lung should be allowed to re-expand gradually until the shrunken lobe lies against the upper mediastinum. In these cases, atelectasis can be highly beneficial, and the ultimate result is often comparable to that with selective thoracoplasty. On the contrary, in the second group artificial pneumothorax is frequently dangerous and division of adhesions seldom improves matters; pneumoperitoneum and diaphragmatic paralysis provide better preparation for collapse or excisional therapy.—*Observations on division of adhesions in opaque lobes, A. J. Coello, J. Thoracic Surg., February, 1951, 21: 135.—(R. E. MacQuigg).*

Extrapleural Pneumothorax.—A total of 129 extrapleural pneumothorax operations in a consecutive series of 121 patients have been evaluated after an average period of 45 months. With few exceptions, these patients were not suitable for other forms of collapse therapy; pneumothorax had been tried in all, without success. In retrospect, 12 patients could be considered desirable risks for thoracoplasty. The group of patients was such in other respects that the result should represent the more favorable side of extrapleural pneumothorax. There were 70.6 per cent successful operations, 16.2 per cent unsuccessful, and 13.2 per cent operative deaths. At the time of

writing, 10 of the patients were dead; 2 from tuberculosis of the larynx, 3 from tuberculous enteritis, and one from tuberculous meningitis. Troublesome and potentially serious complications were present in 49.4 per cent in this series. Tuberculous extrapleural empyema was present at some time in 29.6 per cent of the patients with successful late results. Its occurrence was not related to the severity or extent of the tuberculosis in the operated lung. Streptomycin and *p*-aminosalicylic acid reduced the incidence and severity of tuberculous empyema but did not entirely prevent it. In 5 patients the cavity reopened after it had been closed; in 3, too infrequent refills and, in 2, too early conversion to oil were responsible. Tuberculous wound infection occurred in 8.8 per cent but the wounds healed, and the late result was excellent. The extrapleural space was lost without warning in 3 cases; reoperation within the first two weeks was successful, and the second mobilization was well-tolerated. In 3 patients the cavity was never fully closed, and in 9 the cavity reopened and remained open. In 3 cases there was mixed empyema of the space, which was successfully obliterated in 2 with thoracoplasty. Tuberculous thoracic fistula occurred in 8 patients; in 6 the wound healed, but in 2 it has remained troublesome with reopening of the cavity in one because of inability to maintain the collapse. It is believed that 15 of the failures were preventable. Eleven of the 17 deaths were cardiac in origin. From this series it seems that the mesial aspect of the lung should not be mobilized although the apex should be displaced down below the level of the clavicle to reduce the possibility of a slit cavity. The mediastinum gives a firm surface against which to collapse the cavity; and vago-vagal reflex, one of the hazards of the operation, is eliminated. Streptokinase and streptodornase are recommended to dissolve coagulum which may form in virtually every case on the second postoperative day. Aspiration and irrigation with saline alone eliminated the fluid from the majority of cases. At first, 100 cc. or less of air should be given once or twice a week, and a short refill interval should be maintained during the first year. Introduction of small amounts of a highly refined, heavy mineral oil at the end of each pneumothorax refill over an extended period satisfactorily converts the pneumothorax into a more permanent form of selective collapse. The oil can remain in the space indefinitely without harmful effect. There are no reports in the literature or in this series of voluntarily re-expanded, healed lungs, but extrapleural collapse is looked upon as potentially reversible.—*Importance of extrapleural pneumothorax in the collapse therapy of pulmonary tuberculosis, J. W. Cutler, J. Thoracic Surg., March, 1951, 21: 217.*—(*R. E. MacQuigg*)

Function After Extrapleural Pneumothorax.—The pulmonary function was studied before extrapleural pneumothorax as well as fourteen days and again six months after operation on 30 occasions in 28 patients. Fourteen days after operation, 18 per cent of the vital capacity and 5 per cent of the maximum breathing capacity were lost; six months after operation, the vital capacity was still reduced by 12 per cent, but there was a gain of 2 per cent in the maximum breathing capacity. In 3 patients the pleura was opened, with a resulting intrapleural hemopneumothorax; these patients had lost, fourteen days after operation, 58 per cent of their vital capacity and 49 per cent of their maximum breathing capacity. The total loss of maximum breathing and vital capacities and the shift of function bronchospirometrically were smaller after extrapleural pneumothorax than after any other collapse or resection. This was most evident when the losses were compared in lungs with the same preoperative function as determined by bronchospirometry. The decrease of total pulmonary capacity after extrapleural pneumothorax was chiefly at the expense of functional residual air. Besides the collapse itself, there was interference with the intrapleural pressure mechanism. Even a small rim of intrapleural pneumothorax created a damping effect easily seen by fluoroscopy; the lung followed the thoracic cage imperfectly,

its surface moving less than the chest wall. Destruction of a portion of the thoracic cage is deleterious because: (*1*) The motion of the rib cage is destroyed to a great extent as the orderly sequence of respiratory movement is interrupted. (*2*) The diaphragmatic leaf on the operated side becomes less efficient since its full relaxation is ordinarily aided by contraction of the chest wall. (*3*) The scoliosis due to thoracoplasty places the contralateral lung at a relative mechanical disadvantage. Extrapleural pneumothorax is not at present a substitute for proved collapse measures; time must elapse before the end results can be evaluated.—*Pulmonary function before and after extrapleural pneumothorax, E. A. Gaensler & J. W. Strieder, J. Thoracic Surg., November, 1950, 20: 774.*—(*R. E. MacQuigg*)

Resection Versus Thoracoplasty.—Clinical tuberculous bronchiectasis was the leading indication for resection in a series of 93 patients. The clinical diagnosis was made by bronchograms, and all possible sources of positive sputum after thoracoplasty were investigated before resection. Six months after every thoracoplasty, laminagrams of both sides, bronchograms, and bronchoscopy were carried out on the patients whose sputum still contained tubercle bacilli. In addition to "dead lungs" and thoracoplasty failures, giant cavitation was an important resection indication. There were 20 patients in the latter group, cavities measuring more than 4 cm. being considered giant. Most were of the tension type, and thoracoplasty was a failure in most cases of giant cavity. Occasionally, thoracoplasty was recommended in extremely ill and poor-risk patients as a preliminary to resection. Of the 93 resection patients, 19 died. Most of the patients were extremely poor risks, and resection was a last desperate hope. Many of the cases were operated upon before streptomycin was available. Of the living pulmonary resection patients, 91.9 per cent have sputum free of acid-fast bacilli. The incidence of postoperative spreads and reactivations was low, and it is believed that epidural anesthesia was an important aid in their prevention.—*Resection versus thoracoplasty in the treatment of pulmonary tuberculosis, A. J. Beatty, W. W. Buckingham, & P. Ottosen, J. Thoracic Surg., January, 1951, 21: 34.*—(*R. E. MacQuigg*)

Resection for Pulmonary Tuberculosis.—In a series of 202 patients with pulmonary resection for tuberculosis, there were 98 lobectomies and 104 pneumonectomies. Bronchopleural fistula with empyema occurred in 13 per cent of the patients and was the major cause of death. Spread or exacerbation of disease occurred after 14 per cent of the lobectomies and 10.5 per cent of the pneumonectomies. Fourteen patients died following operation and 11 died later, a total fatality rate of 12.4 per cent. On the other hand, 120 (68 per cent) of the surviving patients are at home and clinically well; 150 (85 per cent) of the survivors have negative sputum or gastric washings on culture. Resection is preferable in the presence of (*1*) tension cavities, (*2*) scattered nodular infiltrates with fibrosis and rarefaction suggesting small cavities, (*3*) lesions so situated as to require extensive thoracoplasty, with needless sacrifice of function, (*4*) some giant cavities, especially in the gutter, (*5*) progressive, caseous pneumonic disease in children or in young adults when it is limited to an upper lobe, resection being preferable in all children to thoracoplasty, and (*6*) tuberculoma or tuberculoma-like lesions. Resection also may be logical for lower lobe lesions which do not respond well to collapse measures. Thoracoplasty should be done initially for such lesions as an extensively involved lung or upper lobe in a seriously ill patient. Thoracoplasty may make resection less hazardous or sometimes even unnecessary. It also reduces the space to be occupied by the remaining lobes if lobectomy is done or makes empyema less serious if infection supervenes or the bronchus opens following pneumonectomy. In the discussion, J. Forsee reported that, in 124 patients with pulmonary resections, the over-all mortality was 4 per cent. Upper-stage thoracoplasty of five ribs should precede or accompany lobectomy. W. Tuttle

commented that in his patients most of the deaths followed the opening of the bronchial stump. The majority of these incidents occurred on the right side where the stump is more difficult to bury. J. Moore discussed more than 200 resections; most of the complications were late fistulas, empyema, or late spreads. The complication rate was greater in those patients who had been treated with streptomycin before surgery. C. Crafoord stated that the incidence of bronchial fistula is small if no naked cartilage is left in the stump and if closure can be done with a continuous peripheral suture and invagination. N. Wilson cited 209 resections performed in the last three years with 137 pneumonectomies (tuberculous complications, 7 per cent), 48 lobectomies (tuberculous complications, 2 per cent), and 24 segmental resections (tuberculous complications, 4 per cent). There were 0.7 per cent tuberculous deaths after pneumonectomy and none after lobectomy or segmental resection. After pneumonectomy, there were 8 deaths from nontuberculous causes, such as shock or coronary occlusion, and 2 per cent of the lobectomy patients died from nontuberculous causes. There was one death from an embolus after segmental resection.—*Resection in the treatment of pulmonary tuberculosis, J. C. Day, W. M. Tuttle, E. J. O'Brien, & F. Hampton, Jr., J. Thoracic Surg., December, 1950, 20: 854.*—(*R. E. MacQuigg*)

CLINICAL STUDIES, NONTUBERCULOUS DISEASES

Tracheotomy for Crushing Chest Injuries.—Although tracheotomy is one of the oldest known surgical procedures, its physiologic effects on the respiratory mechanism have not been adequately investigated. Such effects include a decrease in the amount of respiratory dead space with an increase in effective ventilation and a decrease in resistance to breathing, both on inspiration and expiration. "Crushed chest" and "flail chest" are injuries characterized by multiple rib fractures which cause paradoxical respiratory movements in a portion of the chest wall with mediastinal flutter. Complications, including hemothorax, simple or tension pneumothorax, and "wet lung", may predominate and demand supplementary therapy, but the clinical picture in this type of injury is uniform. Respirations are short, rapid, and accompanied, in the conscious patient, by great pain and marked apprehension. This injury is attended by a high mortality, and most forms of therapy are inadequate. Vital capacity is dangerously reduced by strapping the chest; intercostal nerve block aids in controlling pain. Administration of oxygen under positive pressure may be beneficial. Methods of fixing the loose segments of the thoracic cage have been proposed, but fixation is difficult in constantly moving cancellous bone. The principal aims of therapy are to eliminate paradoxical motion, to keep the tracheal bronchial tree free of secretions, and to relieve pain. The authors found that tracheotomy helped to maintain a clear airway and markedly decreased the paradoxical excursions of the loose segment of the thoracic wall. Pain was strikingly relieved. As a result, oxygenation was improved even though there was no evidence of laryngeal or tracheal obstruction or of excessive bronchial secretion in the majority of cases observed. Thus, the usual purpose of tracheotomy, the relief of obstruction and the removal of secretion, was not the primary aim of this procedure. Experiments on fresh cadavers showed that changing the point of entrance and exit of air from the nose and mouth to the trachea just above the suprasternal notch reduced the dead space approximately 100 cc. Measurements of intrapleural pressures in experimental animals and in human patients before and after tracheotomy showed a consistent significant fall in intrapleural pressure following tracheotomy. The beneficial effects of tracheotomy were reflected in the oxygen saturation of the arterial blood. One patient, before tracheotomy and while receiving oxygen, had an oxygen saturation of 85 per cent with a carbon dioxide content of 29.7 volumes per cent. After tracheotomy, the oxygen saturation rose to 90 per cent, despite the fact that the patient was no longer receiving oxygen, and the carbon

dioxide fell to 27.9 volumes per cent. When adequate pulmonary function is maintained with difficulty, any factor which contributes to more efficient respiration may be the determining influence in survival. In addition to its employment in patients with severe "crushed chest", tracheotomy probably should be used in any instance in which "paradoxical movement" or low tidal volume is of serious moment. Such conditions are encountered in cases in which too extensive rib resections have been performed in thoracoplasty or in removing large tumors of the sternum and ribs and also in patients with an unstable mediastinum in the presence of open pneumothorax. When indicated, tracheotomy should be performed before respiratory difficulties become alarming.—*Tracheotomy, a useful procedure in thoracic surgery, with particular reference to its employment in crushing injuries of the thorax, B. N. Carter & J. Giuseffi, J. Thoracic Surg., May, 1951, 21: 495.*—(*R. E. MacQuigg*)

Early Therapy of Thoracic Injuries.—Although thoracic injuries in World War II comprised approximately 6 per cent of all war wounds, they accounted for more than 32 per cent of the total mortality from wounds. Initial therapy should be directed toward shock which in patients with thoracic injuries may be largely abolished by restoring the normal cardiorespiratory physiologic processes. Maintenance of a normal blood volume and immediate control of any bleeding vessels should have primary consideration. Potential infection should be treated at the earliest opportunity with adequate doses of antibiotics. Cultures of the pleural contents may be misleading as the infection may become localized within the pleural space. One of the most important physiologic disturbances in thoracic wounds is the effect secondary to a closed tension pneumothorax or to an open pneumothorax in which an atmospheric communication exists through the chest wall. Mediastinal swing, which may occur as a result of the disturbed respiratory dynamics secondary to the open pneumothorax, may interfere with venous return by angulation of the great vessels and may reduce cardiac output. Crushing chest injuries may destroy the rigidity of the chest wall and result in "paradoxical respiration," a condition which is incompatible with life. Hemothorax is an almost invariable complication. Early emergency treatment of thoracic wounds should include morphine for the relief of pain, intravenous plasma or blood, when available, the sealing-off of open chest wounds with petrolatum dressings, stabilization of the chest by strapping, and the maintenance of an adequate airway. Later definitive care may be divided into 3 phases: (*1*) the initial or resuscitative phase, (*2*) the reparative phase, and (*3*) the reconstructive phase. Therapy in the first stage is directed in order of importance toward stabilizing the thoracic cage, eliminating chest pain by nerve blocks, tracheal suction, aspiration of blood and fluid when present in the pleural space, water seal drainage of tension pneumothorax, administration of oxygen for anoxia, fluid replacement, and early control of infection. Therapy during the reparative phase may necessitate extensive exploration and debridement of the thorax. The following points deserve attention: (*1*) Surgical closure of a sucking wound must be airtight. If the chest wall defect involves a large loss of bony structure, a muscle flap should be used to close this defect. (*2*) Because of its elasticity, the pulmonary parenchyma should be closed with interrupted sutures rather than with one continuous suture. (*3*) Positive pressure should be used to determine adequate expansion of the lung before closing, and an underwater seal or suction should be instituted to promote re-expansion. (*4*) Progressive bleeding into the pleural space is an indication for thoracotomy. (*5*) In combined thoracic-abdominal wounds the thorax should be explored first, since abdominal exploration is poorly tolerated by patients with thoracic wounds and since it may be possible to explore the abdomen through the diaphragm. Splenic lacerations may be easily managed from the thoracic approach. (*6*) To avoid the crippling limitations of pulmonary function secondary

to an untreated hemothorax, treatment of this complication by aspiration should start within twenty-four hours; a delay of five or six days will increase the difficulty in evacuating the cavity. Aspiration should preferably be high in the chest, since the diaphragm is frequently elevated in hemothorax and most of the fluid blood is in the upper part of the chest. (7) Decortication is indicated, if pulmonary compression persists or if aspiration is unsuccessful, and should be performed from three to five weeks after injury. Earlier, the peel is thin and friable; later, the fibrous union between peel and pleura may be so firm that a proper cleavage plane cannot be established. The visceral pleura beneath the peel is usually of normal consistency and presents adequate re-expansion if decortication is performed at the optimal time.—*Thoracic injuries in World War II: I. General considerations, alterations of pulmonary physiology, and therapy—the initial and reparative phases, H. K. Gray & J. D. Fryfogle, U. S. Armed Forces M. J., August, 1951, 2: 1127.*—(*E. A. Riley*)

Bronchogenic Small-Cell Carcinoma.—Of 849 cases believed to represent primary bronchogenic carcinoma, 75 (8.8 per cent) were diagnosed as small-cell bronchogenic carcinoma. There were 87 men and 3 women, or a ratio of 29 to 1, after including 15 cases on the basis of positive cytologic evidence alone. Of 29 patients who were explored, 15 had pneumonectomy and of these one was alive five years and four months and the other two years and nine months after operation.—*The significance of cell types in bronchogenic carcinoma, J. R. McDonald, R. P. McBurney, J. C. Carlisle, & M. M. Patton, J. Thoracic Surg., July, 1951, 22: 62.*—(*R. E. MacQuigg*)

Bronchogenic Squamous-Cell Carcinoma.—Of all primary bronchogenic carcinomas studied in a series, 37.8 per cent were squamous cell in type. Only 3.5 per cent occurred in women. Bronchoscopy gave positive results in 64.5 per cent and sputum cytology in 72.4 per cent of cases. No patient survived three years without pulmonary resection. Both the five-year survival rate and the two-year survival rate for those patients who survived pulmonary resection were more than 50 per cent. Of greatest prognostic importance was the size of the lesion; the microscopic grade of the tumor did not affect the prognosis. Since more than 99 per cent of the entire group of tumors had areas of grade 3 or grade 4 carcinoma present, it is doubtful that grading of these tumors is of significance.—*Bronchogenic squamous-cell carcinoma, J. C. Carlisle, J. R. McDonald, & S. W. Harrington, J. Thoracic Surg., July, 1951, 22: 74.*—(*R. E. MacQuigg*)

Bronchogenic Large-Cell Carcinoma.—In the series studied, 40.2 per cent of the bronchogenic carcinomas were of the large-cell type and 14.6 per cent occurred in women. The ratio of central to peripheral lesions was 1.4 to 1 for large-cell carcinoma, as compared with 1.9 to 1 for squamous-cell carcinoma, 27.7 to 1 for small-cell carcinoma, but with 0.54 to 1 for adenocarcinoma. Cytologic studies gave positive results in nearly 90 per cent of the adequate examinations. Approximately 55 per cent of the patients who survived resection died within two years. This indicates a poor prognosis for this type of bronchogenic carcinoma, perhaps not as bad as that for bronchogenic adenocarcinoma or small-cell carcinoma, though not nearly so good as for squamous-cell carcinoma.—*Bronchogenic large-cell carcinoma, M. M. Patton, J. R. McDonald, & H. J. Moersch, J. Thoracic Surg., July, 1951, 22: 88.*—(*R. E. MacQuigg*)

Solitary Pulmonary Adenoma.—The preemployment photofluorogram of a sixteen-year-old boy revealed a small mass with a central area of rarefaction at the left base in 1944. A year later roentgenograms revealed no change and he had no symptoms. He was followed by serial roentgenograms, and in September, 1947, an increase in the size of the lesion was noted although he was still asymptomatic and had no physical findings. At operation, a tumor approximately 7 cm. in diameter was removed with a margin of lung tissue. On section it contained a large quantity

of clear, sticky exudate resembling thin egg white and was diagnosed as focal adenomatosis. No recurrence was demonstrable when he was examined three years later.—*Solitary pulmonary adenoma (focal pulmonary adenomatosis): A three-year follow-up after resection, G. P. Rosemond, K. R. Boucot, & E. Aegerter, J. Thoracic Surg., July, 1951, 22: 99.*—(*R. E. MacQuigg*)

Erythroblastosis with Bronchial Carcinoma.—A 46-year-old man had had pain in the left chest for two months followed by lumbar pain, asthenia, anorexia, and rapid weight loss. On admission he was afebrile, but had tachycardia. His face was leaden and somewhat puffy; there was purpura and ecchymosis. The spleen and liver were enlarged but there was only one palpable lymph node, in the right subclavicular fossa. There were some dullness and a few subcrepitant rales at the base of the right lung posteriorly. A blood examination showed 2.8 million red cells, 5,100 white cells, very few platelets, and a hemoglobin concentration of 50 per cent. Of the leukocytes, 26 per cent were neutrophils, 1 per cent eosinophils, 19 per cent lymphocytes and medium-sized mononuclear cells, 6 per cent monocytes, 1 per cent neutrophil myelocytes, and 1 per cent metamyelocytes. Of the erythrocytes, 46 per cent were nucleated, chiefly normoblasts; there was anisocytosis and polychromatophilia with occasional Cabot's rings or Joly's bodies. The bone marrow contained many proerythroblasts with active mitosis. Chest roentgenography revealed a large, round lesion with sharp contours in the parahilar region of the lower lobe of the right lung. No lesions could be found roentgenographically in the digestive tract or the bones of the trunk. The patient's condition deteriorated steadily, and he died a week after admission. The subclavicular gland and a small piece of liver were obtained for histologic examination. The gland was completely invaded by an epithelioid carcinoma characterized by small, round and fusiform, undifferentiated cells with numerous mitoses. The liver contained similar cells. An erythroblastotic anemia, such as seen in this case, may suggest the presence of bronchogenic carcinoma. The marrow changes differ from those in Weil's disease, in myeloma, and in "chronic erythemic myelosis" which Guglielmo considered a separate entity.—*Erythroblastose et cancer latent du poumon, J. Tapie, J. Laporte, R. Ruffie, & Mlle. Gontier, Poumon, July, 1951, 7: 393.*—(*A. T. Laird*)

Tumors of the Ribs and Sternum.—Cartilaginous tumors of the chest wall present singular problems. No cases of osteogenic sarcoma of rib or sternum were encountered at Barnes Hospital, and the reported cases usually could be chondrosarcomas. This low incidence of osteogenic sarcoma of rib and sternum is remarkable in view of the preponderance of osteogenic sarcoma over chondrosarcoma in other sites. Primary malignant tumors of rib and sternum comprise approximately 10 per cent of all primary malignant tumors of the skeleton. Pathologically, these tumors frequently are not recognized as malignant. In the present series of cartilaginous tumors, arose in rib and 16 arose in the sternum, most commonly in the rib near the costochondral junction. Adequate roentgenograms often are difficult to obtain. Cold abscesses and aneurysms of the great vessels eroding the chest wall may appear as firm tumors and cause confusion temporarily. At Barnes Hospital the most common non-neoplastic condition misdiagnosed as chondroma or osteochondroma was the effect of trauma. Either aspiration or incisional biopsy should confirm the cartilaginous nature of the tumor but does not necessarily determine whether the tumor is benign or malignant. Most of the tumors, even the malignant ones, are encapsulated to some degree. The portion of the tumor growing in soft tissue can frequently be "shelled out" of its capsule or pseudo-capsule. This encapsulation is a treacherous characteristic since, in enucleating the tumor, satellite nodules or portions of the malignant perichondrium may be left behind. These satellite nodules usually are connected with the main tumor. The terminology has been unnecessarily complex; the addition of "myxo-" adds little to the

diagnosis of myxochondroma and chondromyxosarcoma, since the mucoid substance is only a product of degeneration. It is important to remove rather long segments of rib since recurrences in the rib stump are common. Microscopic nodules in the periosteum at a distance from the tumor occur as well as marrow extensions. The intercostal muscles above and below the tumor should be removed, usually with segments of the adjacent ribs. Since all tumors of cartilaginous origin are potentially malignant, radical resection is advocated for all monostotic cartilaginous tumors arising in ribs and sternum. An occasional cure may be obtained even for those tumors invading the mediastinum or vertebrae if the resection is as radical as possible. Invasion of lung does not contraindicate resection, since wide local invasion may occur in the absence of distant metastases. The only circumstance in which immediate operation is not recommended for cartilaginous chest wall tumors is when multiple tumors occur, one or more being located in a rib or the sternum. These tumors are usually first evident in childhood; after adolescence, growth slows, and during adult life no new ones form. It seems rational to observe these patients and to operate only on those tumors which continue to grow or which appear after adolescence; that is, on the tumors most apt to be malignant. Roentgenotherapy has no place in the primary treatment of chest wall chondrosarcomas and is of little palliative value.—*Cartilaginous tumors of ribs and sternum, L. W. O'Neal & L. V. Ackerman, J. Thoracic Surg., January, 1951, 21: 71.—(R. E. MacQuigg)*

Surgery for Pleural Sarcoma.—In 1931, Lichtenstein found reports of 31 cases of pleural sarcoma. Eight of the cases were tumors which have the microscopic structure of sarcomas but do not behave like malignant growths. They are well demarcated, do not metastasize, and have no tendency to recur. They generally are asymptomatic until they become large enough to compress adjoining organs; by then they are often inoperable. The authors removed 3 sarcomas of this type, all discovered during routine examination of the chest. They were fist-sized and easy to enucleate. The patients were well two and one-half years, eighteen months, and three months after operation, respectively.—*Surgical treatment of three cases of pleural sarcoma, S. Ramstrom & H. Hellsten, J. Thoracic Surg., February, 1951, 21: 116.—(R. E. MacQuigg)*

Repair of Aortic Aneurysm.—Successful repair of an aortic aneurysm after erosion of the sternum had occurred has not been previously reported. A 38-year-old white woman had noted a reddish lump over the sternum four years before admission; antiluetic treatment on two occasions had caused the mass to decrease. On admission, there was an aortic aneurysm of hour-glass configuration, one portion being intrathoracic, the other extrathoracic, with the constricted portion at the level of a sternal perforation. During seven days of diagnostic procedures, the aneurysm continued to increase in size, and rupture seemed imminent. At operation, through a right posterolateral approach, the aneurysm was found to arise from the anterior portion of the ascending aorta. Since polythene film contains dicetyl phosphate which stimulates the formation of fibrous tissue, four strips of 1.5 ml. film, one inch wide, were passed around the base of the aneurysm and sutured superficially to its wall. Twenty-six days after operation, her previous pain had disappeared. There were no pulsations, and the mass felt soft and cystic. When 35 cc. of yellowish-brown serum were aspirated, the sac collapsed to one-third its previous size, the skin could be indented, and the edge of the sternal defect could be palpated. Four months after operation the tumor had entirely disappeared, and the bony defect in the sternum was replaced with firm scar tissue.—*Successful repair of an aortic aneurysm with sternal perforation, A. Cowley, H. E. Sloan, & N. H. Sullenberger, J. Thoracic Surg., February, 1951, 21: 159.—(R. E. MacQuigg)*

Bullet Embolus to Left Femoral Artery.—In this sixth surviving case of embolization to

an artery following a thoracic bullet wound, the nature of the leg lesion was not immediately realized. It was thought that the bullet, which entered the right hip, had damaged the lumbosacral plexus on the left, causing paralysis. The bullet was removed from the left femoral artery approximately eighteen hours after the accident. No anticoagulant therapy was available; gangrene developed, and a supracondular amputation was performed. Sixteen months after the accident the patient was in good condition. In bullet wounds with only a wound of entrance, failure to demonstrate the missile in the expected region suggests that it has entered the cardiovascular system and been carried away. Early ischemic motor and sensory paralysis may suggest a lesion of the nervous system. The correct diagnosis should lead to early embolectomy.—*A bullet embolus to the left femoral artery following a thoracic gunshot wound, J. L. Keeley, J. Thoracic Surg., June, 1951, 21: 608.—(R. E. MacQuigg)*

Chylothorax.—A 76-year-old man with spontaneous right chylothorax recovered uneventfully following repeated aspirations. The most likely cause seemed to be rupture of the lower part of the lymphatic duct as the result of a coughing spasm, since the chylothorax had been preceded by an acute upper respiratory infection with a moderately severe productive cough.—*Spontaneous chylothorax with recovery, H. Crasweller, Canad. M. A. J., September, 1951, 65: 257.—(E. A. Riley)*

Accessory Diaphragm.—Drake and Lynch recently reported a 24-year-old man with right lower lobe bronchiectasis; the diseased portion of the lobe was trapped by an extra leaf of the diaphragm rising from the dome of the normal diaphragm. The two parts of the lobe were connected posteromesially through an aperture in this extra leaf. The subject of this report is a 7-year-old white girl who was thought to have atelectasis of the right middle or lower lobe. At operation an accessory diaphragm was present. One leaf was in the normal location, without defects but almost devoid of muscle, contracting only slightly on inspiration. The accessory or upper diaphragm was attached anteriorly to the pericardium and central tendon. It arched posteriorly to end near the angle of the fifth rib, creating a separate compartment for the right lower lobe. Phrenic stimulation produced vigorous contraction of the muscular accessory diaphragm but feeble contraction of the normally situated leaf. A discrete right middle lobe could not be found. The accessory diaphragm was excised because the aperture through which the hilum of the lower lobe extended was so small that obstruction of the bronchus may have occurred. This hiatus may not have increased as the child grew and the hilar structures enlarged.—*Accessory diaphragm, T. B. Sappington, Jr. & R. A. Daniel, Jr., J. Thoracic Surg., February, 1951, 21: 212.—(R. E. MacQuigg)*

Anomaly of Pulmonary Veins.—Anomalous drainage of the right inferior pulmonary vein into the inferior vena cava was observed at operation in a patient who was studied by angiocardiography, cardiac catheterization, and bronchospirometry. Approximately one-fourth of the oxygenated blood from the lungs was shunted in this patient so that it re-entered the right side of the heart; only three-fourths of the blood in the pulmonary circuit was available for oxygen transport to the tissues. Despite this, the ability to sustain physical effort was repeatedly demonstrated. The stroke volume of the right ventricle was one-third greater than that of the left ventricle, but there was no evidence of right ventricular hypertrophy or cardiac strain. Surgical intervention did not seem indicated, and the patient was returned to full military duty.—*An anomaly of the pulmonary veins, F. N. Cooke, J. M. Evans, A. D. Kistin, & B. Blades, J. Thoracic Surg., May, 1951, 21: 452.—(R. E. MacQuigg)*

Pulmonary Lobe from Esophagus.—The first reported anomalous pulmonary lobe arising from the esophagus was found in a five-month-old girl who had a chronic cough, rapid

respiration, intermittent fever, and failure to gain weight. Bronchoscopy revealed both the left lower and upper lobe bronchi to be compressed posteriorly. Esophagoscopically, a diverticulum almost as large as the esophagus itself and apparently lined with normal mucosa was seen at approximately the level of the tracheal bifurcation. At operation, a smooth encapsulated mass, approximately 8 cm. in diameter, was removed from the apex of the left chest cavity. A firm tubular structure, 10 mm. in circumference and containing islands of cartilage, entered the mass and divided repeatedly. This anomalous lobe should have been the left eparterial segment since it received all of its blood supply from the pulmonary artery.—*Anomalous lobe of lung arising from the esophagus, S. L. Gans & W. J. Potts, J. Thoracic Surg., March, 1951, 21: 313.—(R. E. MacQuigg)*

Fibrous Bone Dysplasia.—A case of extensive, invasive monostotic fibrous dysplasia primary in the right fourth rib and involving the third and fifth ribs was treated by wide excision followed by closure of the thoracic cage posteriorly by the scapula and anterolaterally by the pectoralis major muscles and a remnant of the serratus anterior. The patient's only inconvenience has been a slight thoracic herniation during coughing and sneezing, and he has remained well for three years. Such tumors may be diagnosed clinically by localized swelling and tenderness, spontaneous pathologic fracture, and by chest roentgenography. Unusual cutaneous pigmentation may develop on the head, neck, buttocks, and extremities. Precocious puberty may be noted in girls. Serum calcium, phosphorous, and acid and alkaline phosphatase are normal. The proper treatment for solitary rib lesions is wide excision removing pleura, intercostal nerve, and thoracic muscle en masse. Cutting into the tumor for frozen section is not recommended because of the danger of spillage of malignant cells. The results reported from radiation therapy indicate minimal benefits.—*Monostotic fibrous dysplasia of bone, F. M. Flickinger, J. Thoracic Surg., March, 1951, 21: 298.—(R. E. MacQuigg)*

Gastric Mucosa in the Esophagus.—In the esophagus, heterotopic gastric mucosa occurs most frequently in the postericoid region. In this location, Schridde found aberrant islets of gastric mucosa in 70 per cent of autopsied cases, the islets varying from microscopic to 2 cm. in diameter. Such islets may occasionally be recognized endoscopically as shallow depressions of pinkish epithelium. One should distinguish between this condition and a thoracic stomach associated with short esophagus. In the author's case the lower half of the esophagus was completely lined with gastric mucosa. At the junction between gastric and squamous epithelium about the level of the aortic arch, ulceration and stricture formation had occurred. A small, easily reducible hiatal hernia was noted by barium study, but at operation the entire stomach lay below the diaphragm. The lower half of the esophagus was resected and the stomach elevated to the apex of the chest for anastomosis.—*Heterotopic gastric mucosa in the esophagus with ulceration and stricture formation, L. H. Bosher & F. H. Taylor, J. Thoracic Surg., March, 1951, 21: 306.—(R. E. MacQuigg)*

Bronchobiliary Fistula.—Bronchobiliary fistula may occur as a complication of an infradiaphragmatic disease, such as amebic abscess, echinococcus cyst of the liver, or biliary tract suppuration. It is characterized by the expectoration of bile. In a 23-year-old white man a bronchobiliary fistula developed as a complication of Hodgkin's disease.—*Bronchobiliary fistula in Hodgkin's disease, S. Trubowitz, A.M.A. Arch. Int. Med., September, 1951, 88: 400.—(G. C. Leiner)*

Cervical Esophagostomy.—When gavage became intolerable to patients with cancers of the pharyngeal and cervical areas, a gastrostomy has often been performed but frequently is unsatisfactory. A cervical esophagostomy has been employed successfully in one such patient. The procedure is simple and may be done under local anesthesia in a few minutes. Wound contamination is controlled by antibiotics, and closure of the incision is omitted to minimize the risk of infection in the supe-

rior mediastinum. Care is simple, drainage is minimal, and regurgitation of food does not occur. Skin excoriation has not occurred.—*Cervical esophagostomy, C. T. Klopp, J. Thoracic Surg., May, 1951, 21: 490.*—(*R. E. MacQuigg*)

Streptokinase-Streptodornase for Empyema.—One or more intrapleural injections of streptokinase-streptodornase were used in treating 21 cases of postpneumonic empyema, including 4 cases of putrid empyema. In 18 cases, including 3 of the putrid type, the liquefaction by the enzymes was followed by improvement ranging from rapid termination of disease by crisis to marked immediate improvement followed by subsequent defervescence. In successful cases, enzyme therapy allowed evacuation of loculated empyemal cavities within twenty-four hours, followed by re-expansion of the lung. Rapid sterilization of the area frequently followed enzymatic debridement used with antibiotic therapy. Before the use of the enzymes, each of the patients had received one or more of the antibiotics systemically and often intrapleurally without curative effect. In 2 patients treated on the thirtieth and forty-second days of the disease, the enzymatic injections were not effective, presumably because of extensive cellular organization. In one of the patients with putrid empyema, liquefaction with streptokinase-streptodornase was followed by reopening of a bronchopleural fistula that made subsequent treatment more difficult. In 4 patients, injections of the enzymes were employed in association with closed thoracotomy. The results were highly favorable in evacuating exudate and promoting re-expansion of the lung.—*The use of streptokinase-streptodornase in the treatment of postpneumonic empyema, W. S. Tillett, S. Sherry, & C. T. Read, J. Thoracic Surg., March, 1951, 21: 275.*—(*R. E. MacQuigg*)

Pulmonary Sarcoidosis.—A case diagnosed as sarcoidosis of the lung occurred in a man thirty-five years of age who was admitted to the hospital, complaining of cough and moderate dyspnea. His cough had begun three weeks before his admission and was accompanied by pain at the base of the right lung. He had continued to work but tired rapidly. Although underweight, he did not look ill and he had had no fever. Physical examination of the lungs showed no abnormalities. Radiographs of the chest taken during the month after admission all showed generalized bilateral nodulation. Radiographs of both hands showed no abnormalities. The serum globulin was 2.7 gm. per 100 cc. and the blood calcium was low. Erythrocyte and leukocyte counts were normal; the differential count showed 6 per cent eosinophilic, 11 per cent mononuclear, and 29 per cent young polymorphonuclear leukocytes. The sedimentation rate was 4 mm. per hour. A tuberculin patch test was negative. Bronchoscopy showed normal structures except that the walls of all of the smaller bronchi were coated with a thin, whitish, mucopurulent exudate. Examination of the bronchial secretions gave negative results; no bacteria or fungi were found. Cultures were negative for tubercle bacilli. The patient at first had a slight fever, at one time 100°F., and was given penicillin, one million units daily for eight days, and iodides for sixteen days. His dyspnea gradually diminished and his cough disappeared. Three months after admission, a chest radiograph showed almost complete disappearance of the lung lesions and one month later they had disappeared. The diagnosis of pulmonary sarcoidosis seemed justified.—*Sarcoidose pulmonaire, R. Lesage, Laval méd., May, 1951, 16: 614.*—(*A. T. Laird*)

Sarcoidosis.—Of 18 cases of sarcoidosis illustrating the main features and complications of the disease, 4 cases showed a well-calcified primary complex, although the Mantoux test was negative. One case was diagnosed following exploratory thoracotomy. Two cases were autopsied: one of these showed right ventricular hypertrophy secondary to severe pulmonary involvement; the second showed extensive cardiac fibrosis with many aggregates of small round cells. Streptomycin was used in 4 cases but no dramatic response was noted. Although the prognosis of sarcoidosis

is usually regarded as good, half of the patients in this group had various degrees of disablement.—*The manifestations of sarcoidosis, O. D. Beresford, Canad. M. A. J., September, 1951, 65: 245.—(E. A. Riley)*

Etiology of Sarcoidosis.—Culture on chicken embryos of the gastric juice from patients with sarcoidosis revealed the presence of a virus in 7 of 10 cases. Serologically, this virus seemed to be identical with, or related to, the mumps virus. A virus with similar serologic properties was found in 3 of 8 cases of Hodgkin's disease. The virus gives serologic reactions with the serum from patients with sarcoidosis; the killed virus produces skin reactions in such patients. It is not believed that the question of the etiology of sarcoidosis has been solved by these studies.—*Isolierung eines Virus aus einigen Fallen von Boeck's Sarcoid, S. Löfgren & H. Lundbäck, Wien. klin. Wchnschr., June 1, 1951, 63: 399.—(G. C. Leiner)*

Coccidioidomycosis.—In Kern County, California, positive skin reactions to coccidioidin were found in 17 per cent of children who had lived there less than one year and in 77 per cent of those who had lived in this area ten or more years. The incubation period of coccidioidomycosis is ten to eighteen days. Three-fifths of the infections are asymtomatic. The presenting symptoms in children are cough, fever, general malaise, and night sweats. Pleural pain is common in the preteenage group. Erythema nodosum or erythema multiforme develops in 5 to 10 per cent. The conversion of the skin test occurs during the second or third week of infection. Precipitation tests give positive results in the primary infection in 50 per cent in the first week and 90 per cent within two weeks. Loss of precipitins begins in the third week. Complement fixation tests are helpful later since antibodies are slow in development. Persistence of positive complement fixation test beyond six months is unusual, except in disseminating disease. Sputum examination in children is unsatisfactory and coccidioidal cavitation occurs rarely in them. If skin sensitivity is maintained in the disseminated form, the outlook is more favorable. The infection in Negroes carries greater hazard of dissemination than it carries in white persons.—*Coccidioidomycosis in children, C. I. Mead, J.A.M.A., May 12, 1951, 146: 85.—(H. Abeles)*

Pulmonary Histoplasmosis.—Of 2 cases of pulmonary histoplasmosis, one simulated an infected cyst, the other resembled tuberculosis. Both patients were treated by lobectomy. They are well two years and six months, respectively, after operation.—*Pulmonary histoplasmosis: Summary of data on reported cases and a report on two patients treated by lobectomy, C. H. Hodgson, L. A. Weed, & O. T. Clagett, J.A.M.A., March 17, 1951, 145: 807.—(H. Abeles)*

Q Fever in California.—Within three years, more than 700 cases of Q fever were reported in California; 180 cases in northern California were studied. The onset was sudden, with fever and chills in 72 per cent of the cases. The initial temperature was usually between 104° and 106°F.; some fever persisted for two days to three months. Profuse diaphoresis occurred in one-third of the patients, headache in more than two-thirds, cough in one-fourth, and chest pain in one-tenth. Physical signs referable to the respiratory tract were rare. Anorexia was present in 43 per cent of the patients, hepatomegaly in 11 per cent, liver tenderness in 7 per cent, and jaundice in 5 per cent. Seven patients developed various skin lesions. The white cell count was slightly depressed to slightly elevated during the first week of illness; later, it became elevated in many cases. Complement fixing or agglutinating antibodies were present in the serum of all patients. *Coxiella burnetii* was recovered from the blood of 7 patients. A total of 89 chest roentgenograms were made on 65 patients; 20 roentgenograms from 18 patients showed infiltrative lesions, usually in the lower lobes. Demonstrable pulmonary lesions are not essential for the diagnosis of Q fever.

The mean duration of fever was 16.3 days. Thirty patients (17 per cent) were febrile longer than four weeks. More prolonged illness occurred more frequently in patients who were 40 years of age or older. Symptoms or signs referable to the respiratory tract were present in 9 of the 30 patients. There was no death due to Q fever.—*Q fever in California: VII. Clinical features in one hundred eighty cases, W. H. Clark, E. H. Lennette, O. C. Railsback, & M. S. Romer, A.M.A. Arch. Int. Med., August, 1951, 88: 155.*—(*G. C. Leiner*)

Oil Aspiration Pneumonia in Infancy.—The danger of oily medications in the form of nose drops or throat sprays is widely recognized. The circumstances in which their use is dangerous are less clear: (*1*) excessive dosage predisposing to aspiration; (*2*) the position of the head at the time of instillation or spraying; (*3*) the same factors which increase the chance of aspirating oils administered by mouth. A large minority of the cases have occurred in infants; the remainder, mostly in middle-aged or elderly persons who suffer from chronic immobilizing diseases such as hemiplegia or rheumatoid arthritis. It is etiologically significant that practically none of the affected infants had been in good health before the administration of oil; furthermore, some additional pulmonary infection seems to have immediately preceded death. When the lungs are "oil-logged", a slight pulmonary infection may kill the child. Proof of the diagnosis in an infant must be almost impossible before death; a history of prolonged or excessive administration of medicinal paraffin or cod-liver oil to a debilitated infant or to one who actively resists dosing should, in the presence of symptoms or signs of pneumonia, suggest this diagnosis. The only treatment is to stop the administration of oil and to prevent or treat infection. Prophylactic measures are as follows: (*1*) avoidance of medicinal paraffin nose drops; (*2*) abandonment of medicinal paraffin as a lubricant for esophageal or gastric tubes or bronchoscopes; (*3*) avoidance of medicinal paraffin laxatives in infants who resist administration, who are suffering from cough or dysphagia, or who are debilitated; (*4*) similar precautions with cod-liver oil.—*Oil aspiration pneumonia in infancy, F. S. W. Brimblecombe, L. Crome, & J. P. M. Tizard, Arch. Dis. Childhood, April, 1951, 27: 141.*—(*L. Levin*)

Antihistaminics for Pneumonia.—Twenty patients with pneumonia were treated with an antihistaminic agent, Antistin, alone or in conjunction with penicillin. The antihistaminic agent seemed to have a favorable effect, especially with pneumonias in elderly people and in the presence of circulatory insufficiency. —*Die Behandlung der Lungenentzuendung mit Antihistamin, A. Szöke, E. Löwei, & G. Ludány, Wien. klin. Wchnschr., June 8, 1951, 63: 418.*—(*G. C. Leiner*)

Bronchial Yardstick.—An instrument called a "bronchial yardstick," for obtaining linear measurements within the tracheobronchial tree, consists of a brass rod 1.5 mm. in diameter. On it are mounted, in unattached tandem, two jewelers' pin clutches small enough so that it is possible to see past them in the lumen of the bronchoscope. A small fitting at the end of the rod prevents escape of a faulty pin clutch and acts as a sort of gun sight, making it easier to place the end of the rod accurately on the border of any lesion. It is possible by successive settings of the clutches to measure the distance from the carina to the lesion and the size of the lesion. —*A bronchial yardstick, E. B. Emerson, Jr., J. Thoracic Surg., May, 1951, 21: 516.*—(*R. E. MacQuigg*)

Catheter Diagnosis of Patent Ductus.—Aortography is the only satisfactory roentgenologic method routinely used in adults for the examination of patent ductus arteriosus. In children, it is hard to get a technically successful aortogram and it is quite impossible in infants. There is, however, another way of visualizing a patent ductus directly. If a wide ductus is present, it is often easy to maneuver a catheter from the pulmonary artery through the ductus into the aorta. This direct method does not involve any new and troublesome

manipulation for the patient. If success is not achieved after a few minutes, the attempt should be abandoned. During the past year, 10 cases of patent ductus were catheterized, and the catheter was passed through the ductus in 4. The entire series of 22 cases of patent ductus contained 5 with an atypical murmur. One had a catheter passed as described; in the other 4 cases, no attempt was made to insert the catheter into the ductus. Critical observations alone in these cases were not enough for diagnosis. Even if the higher oxygen content in the pulmonary artery than in the right ventricle indicates an interarterial shunt, it does not prove that a patent ductus is present. Particularly if the murmur is not continuous but has distinct systolic and diastolic components, there may be a communication between a sinus of Valsalva and the pulmonary conus or artery. It is nearly always possible to demonstrate a patent ductus by thoracic aortography, but, first, one should try to catheterize the ductus itself.—*Patent ductus arteriosus, J. Karnell, G. Jonsson, & B. Broden, Acta radiol., May, 1950, 33: 389.*—(*L. Levin*)

Dynamic Angiocardiography.—The dynamics of the beating heart were studied during angiocardiography by roentgenograms taken at 12 exposures per second. At this speed, full systole and diastole were recorded, even in infants. Three-dimensional visualization of the cardiac chambers was achieved by synchronous photography in two planes. The device used had two shielded magazines of cassettes, one in the horizontal, the other in the vertical, plane; each magazine held 70 cassettes. The cassettes were made of two sheets of paper, with the film placed between intensifying screens. The packs of cassettes were pressed against a rotating radiopaque disc in which there was a radial slit. At each revolution the disc caught the uppermost cassette from the magazine and brought it into position to be exposed. The exposed cassette was then ejected by a spring wheel into a collecting bag. Simultaneous electrocardiography showed the number of pictures per cardiac cycle. With this technique, such momentary events as the transient filling of a patent ductus and of small shunts inside the heart have been visualized.—*The diagnostic value of dynamic studies in angiocardiography: Evaluation of new rapid technique, T. F. Keyes, C. Wegelius, & J. Lind, J. Thoracic Surg., February, 1951, 21: 164.*—(*R. E. MacQuigg*)

ANTIMICROBIAL THERAPY

Streptomycin Resistance.—All of the patients included in the streptomycin evaluation study sponsored by the Public Health Service had sputum examinations at the fifth, ninth, fourteenth, twenty-seventh, fortieth, and fifty-third weeks. Streptomycin-resistance tests were made on the cultures of tubercle bacilli isolated at these intervals from 157 patients who had been treated with streptomycin, 20 mg. per kg., per day for 91 days. The data show that (*1*) at the end of 53 weeks 40 per cent of the sputa were negative; 16 per cent contained streptomycin-sensitive bacilli; in 18 per cent the bacilli were moderately resistant (to 10 γ per ml.); and in 20 per cent the bacilli were strongly resistant (to more than 100 γ per ml.). (*2*) Once the tubercle bacilli became resistant, the tendency was for resistance to persist after the cessation of treatment, although in 18 per cent there was reversion to sensitive strains. (*3*) In the majority of patients, resistance developed during treatment. (*4*) There were 18 patients who could not be included in the study because their initial cultures were found to be resistant to streptomycin. Five of these were found to have received streptomycin previously but the remaining 13, as far as could be determined, had not received streptomycin.—*Resistance to streptomycin of tubercle bacilli isolated from patients treated with streptomycin, S. Ferebee & F. Appel, Pub. Health Rep., March 2, 1951, 66: 277.*—(*S. Hadley*)

PAS and Resistance.—The effect of *p*-aminosalicylic acid (PAS) on the emergence of tubercle bacilli resistant to streptomycin has been studied in 114 patients receiving dihydro-

streptomycin and 103 patients receiving dihydrostreptomycin and PAS. The patients received drug therapy for 13 weeks and were observed for a total of 27 weeks. All patients received dihydrostreptomycin, 1.0 gm. daily, and one group received PAS, 10 gm. daily, in addition. The results show that: (*1*) The major changes in sensitivity occurred during therapy. (*2*) At the end of treatment, 37 per cent of the dihydrostreptomycin group and 57 per cent of the dihydrostreptomycin-PAS group had sputum from which tubercle bacilli could not be cultured. Streptomycin-resistant (to 10 γ or more per ml.) organisms were found in 51 per cent of the dihydrostreptomycin group and in only 9 per cent of the group receiving both drugs. (*3*) There was no correlation between the roentgenographic type of disease and the effectiveness of PAS in suppressing the emergence of streptomycin-resistant bacilli. However, resistance in both groups was more commonly associated with far advanced disease and particularly progressive disease with cavities.—*Effect of PAS on the emergence of tubercle bacilli resistant to streptomycin, a Public Health Service cooperative investigation, Pub. Health Rep., July 6, 1951, 66: 863.—(S. Hadley)*

Streptomycin Treatment.—Twelve-month observations were completed on a series of 541 tuberculous patients studied to determine the effect of adding streptomycin to other antituberculous therapy. Approximately one-half of this group were treated with streptomycin, 20 mg. per kg. per day for 91 days; the rest served as controls. There was remarkable similarity between the two groups initially in regard to age, sex, race, symptoms, and type and amount of disease. Mortality figures, changes in weight, temperature, sputum, and roentgenograms were carefully followed. In every respect the streptomycin-treated patients did better than the controls. Although the differences in the two groups were greater at the end of three months than after twelve months, the superiority of the treated groups was marked throughout. The interpretation is that for patients who are going to improve, the rate is accelerated by treatment; for those who are to become worse, death is delayed; and for those whose fate is doubtful without therapy, streptomycin is apt to swing the balance favorably.—*A controlled investigation of streptomycin treatment in pulmonary tuberculosis, E. Long & S. Ferebee, Pub. Health Rep., November 3, 1950, 65: 1421.—(S. Hadley)*

Laryngeal Tuberculosis.—Seventy patients with laryngeal tuberculosis were treated with streptomycin and/or *p*-aminosalicylic acid. All but 2 of 39 patients with pain were completely relieved; hoarseness was improved in all but 6 patients. Marked to complete healing occurred in 37 patients, improvement was slight in 5, and moderate in 23. In 2 patients the condition remained unchanged, and in 3 patients the disease progressed.—*Treatment of tuberculosis of the larynx by chemotherapy, L. J. Wallner, G. C. Turner, M. R. Lichtenstein, & H. C. Sweany, J.A.M.A., April 21, 1951, 145: 1252.—(H. Abeles)*

Tuberculous Meningitis.—A series of 30 cases of tuberculous meningitis and 4 cases of miliary tuberculosis were treated with streptomycin drugs. For an adult with meningitis, 2 courses of therapy were instituted. The first course consisted of intramuscular streptomycin, 2 gm. daily, for four months and 100 consecutive intrathecal injections of 50 mg. daily. Following a rest period of two to four weeks, a second course was begun consisting of intramuscular streptomycin, 2 gm. daily, for three months and 50 intrathecal injections of 50 mg. at two-day intervals. For children the dosage was reduced according to body weight. For adults with miliary disease a four-month course of intramuscular streptomycin, 2 gm. daily, was given followed by a rest period of one month, after which a second course of intramuscular streptomycin was given for a month. *p*-Aminosalicylic acid was usually given concomitantly. Between August, 1949, and July, 1950, streptomycin was used and, subsequent to that date, dihydrostreptomycin was used: 17 cases of menin-

gitis were treated with streptomycin with 14 recoveries and 3 deaths; 13 cases were treated with dihydrostreptomycin, with 8 recoveries and 5 deaths. The 4 cases of miliary tuberculosis recovered. Among the 13 cases of meningitis treated with dihydrostreptomycin, 4 patients developed either complete or partial deafness during treatment or soon after completion. Recovery in these 4 patients was otherwise uncomplicated. The evidence suggests that the deafness was caused by dihydrostreptomycin rather than by the meningitis, and there are no grounds for treating tuberculous meningitis with dihydrostreptomycin rather than streptomycin.—*Deafness from dihydrostreptomycin, R. W. Biagi, Brit. M. J., September 15, 1951, No. 4732: 651.*—(*E. A. Riley*)

Sensitization to Streptomycin.—A 37-year-old nurses' aide had worked since 1945 in a tuberculosis sanatorium. She had been treated for bilateral pulmonary tuberculosis in the past and was well stabilized for many years. In 1948 she developed streptomycin sensitivity while handling the drug. The clinical manifestations were severe dermatitis, palpebral edema, conjunctivitis, headaches, and weight loss. Most of these symptoms disappeared when she no longer had contact with streptomycin. One year later a roentgenogram showed a new tuberculous lesion. In spite of the simultaneous administration of antihistaminic agents, there was, after the first injection of 1 gm. of dihydrostreptomycin, a strong reaction, with severe facial edema and an exacerbation of the skin lesions of both arms. An attempt at desensitization with increasing doses of streptomycin was unsuccessful.—*Conséquences d'une sensibilisation professionelle à la streptomycine, G. Rocher & J. Baron, Semaine d. hôp. Paris, April 6, 1951, 27: 1149.*—(*V. Leites*)

Benemid with PAS.—Benemid enhances the plasma concentration of *p*-aminosalicylic acid (PAS) in various degrees in different individuals, but the average increase is of the order of 2 to 4 mg. per 100 ml. of plasma. This statement is supported by the findings in 24 of 30 patients. It is suggested, on the basis of preliminary observations, that increases in PAS plasma concentrations (measured as "free amine" by the method of Way) parallel increases of tuberculostatic activity of plasmas containing PAS. Increases of plasma PAS under the influence of Benemid have therapeutic implications. The application of Benemid to the treatment of human tuberculosis remains to be evaluated critically, but the low toxicity of the drug and its proved activity justify the investigation of (*1*) the possibility that Benemid and small doses of PAS may maintain plasma concentrations of PAS sufficient to prevent the emergence of resistant strains of *M. tuberculosis*, or (*2*) that Benemid, plus large doses of PAS, administered by any route, may result in higher plasma concentrations that will give PAS per se greater therapeutic value (Authors' summary).—*'Benemid' as an adjunct to para-aminosalicylic acid therapy, W. P. Boger & F. Fitzpatrick, Tuberculology, August, 1951, 12: 162.*—(*L. Levin*)

Neomycin.—A total of 31 patients with virus pneumonia, tuberculosis, and diseases caused by gram-negative bacilli were treated with neomycin. The results were encouraging with the exception of far advanced cases of pulmonary tuberculosis and brucellosis. In 7 patients with extrapulmonary tuberculosis, of whom 3 had not benefited from streptomycin treatment, uniformly good results were obtained.—*Neomycin therapy, its use in virus pneumonia, tuberculosis and diseases caused by gram-negative bacteria, E. R. Kadison, I. F. Volini, S. J. Hoffman, & O. Felsenfeld, J.A. M.A., April 28, 1951, 145: 1307.*—(*H. Abeles*)

Amithiozone.—A study of 75 patients with moderately and far advanced pulmonary tuberculosis treated with amithiozone or with amithiozone and streptomycin and/or PAS for periods up to ten months indicated that amithiozone in daily doses up to 150 mg. was safe if used under close medical supervision and with laboratory checks. Depression of any or all of the formed elements of the blood

appeared but was transitory; restitution occurred even with continued medication. Hepatic insufficiency, jaundice, and hepatomegaly were encountered but were occasionally reversible, and treatment was resumed when the condition had subsided. Gastrointestinal disturbances likewise disappeared when the drug was discontinued and were less likely to recur when the medication was resumed. Clinical improvement from the combination was greater than would have been expected with any one of the agents alone. Elevated temperatures gradually fell and remained normal except in the presence of a spread or intercurrent infection; cough and expectoration were markedly diminished, appetites improved, and gain in weight and strength was prominent. Sputum conversion was frequent on the combined regimens. It is believed that spreads were less frequent than usually would be anticipated in such cases.—*Tibione in the treatment of tuberculosis; Activity, dosage and toxic manifestations, S. H. Belgorod, H. Alexander, C. E. Meidt, & J. McGaley, Dis. of Chest, July, 1951, 20: 1.*—(*E. A. Rouff*)

Streptomycin and Histoplasmosis.—Earlier reports have described the growth enhancement by streptomycin of *Histoplasma capsulatum* in synthetic media. In this study, mice were infected with a strain of *Histoplasma* which was known to thrive on streptomycin. One-half of the animals received streptomycin. Different numbers of fungi and various amounts of drug were used. In no instance was the fatality rate increased by streptomycin. Tuberculosis and histoplasmosis are sometimes similar clinically; these results suggest that there is no danger in administering the drug in cases of histoplasmosis which are misdiagnosed tuberculosis.—*Failure of streptomycin to enhance the infectivity of Histoplasma capsulatum in mice, R. Campbell & S. Saslow, Pub. Health Rep., January 5, 1951, 66: 16.*—(*S. Hadley*)

Enzymology of *Mycobacteria*.—The influence of a number of antibiotics and synthetic inhibitors on the diamine oxidase of *M. smegmatis*, *M. avium*, *M. tuberculosis* var. *hominis* (H37Rv, streptomycin-sensitive), *P. aeruginosa*, and *M. pyogenes* var. *aureus* were studied. Dihydrostreptomycin trihydrochloride, pyocyanin hydrochloride, streptothricin sulfate, and chloramphenicol were the antibiotics used. Ephedrine; *l*,*p*-nitrophenyl-2-amino-1,3-propanediol; 2-(4′-aminophenylpyridine); 4-acetylamino-benzaldehyde thiosemicarbazone (TB I); and *p*,*p*′-diaminodiphenylsulfone-N,N′-didextrose sulfonate (Promin) were studied as synthetic inhibitors of diamine oxidase. From previous studies it appeared that streptomycin, through its basic guanidine groups, acts directly on ba ·ria diamine oxidase. The present study shows that diamine oxidase is inhibited, not only by streptomycin and dihydrostreptomycin, but also by pyocyanin, streptothricin, and chloramphenicol. The synthetic amines used are also inhibitory as is the diguanidine derivative, arcaine. These results do not necessarily mean that the interaction of diamine oxidase with antituberculous agents plays an essential role in their therapeutic function. Of all the clearly defined enzymes known to be inhibited by dihydrostreptomycin, however, the most sensitive so far found is the diamine oxidase of the human pathogenic *M. tuberculosis*. In many instances the behavior of the bacterial diamine oxidase duplicates the reaction of the whole microorganism towards streptomycin or dihydrostreptomycin. It has been shown for the first time that some antibiotic and tuberculostatic agents can interfere with the amine metabolism of pathogenic organisms.—*Enzymology of tubercle bacilli and other Mycobacteria: V. Influence of streptomycin and other basic substances on the diamine oxidase of various bacteria, C. A. Owen, Jr., A. G. Karlson, & E. A. Zeller, J. Bact., July, 1951, 62: 53.*—(*F. G. Petrik*)

Surface Active Agents and Tubercle Bacilli.—A total of 142 surface active agents including anionic, cationic, and nonionic groups were tested for bactericidal action against tubercle bacilli. Only one preparation, Armeen 14D,

showed sufficient activity to be considered a practical disinfectant. The relative ineffectiveness of the compounds as a group is presumed to be related to the high phospholipid content of the bacilli. This applies even to the quaternary ammonium salts which are now in widespread use in disinfection. Cresol solution 1:100, ethyl and isopropyl alcohols in several strengths, mercuric chloride 1:1,000, and formaldehyde at 4 per cent were again shown to be most effective as disinfectants against tubercle bacilli.—*The bactericidal effect of surface active agents on tubercle bacilli, C. R. Smith, H. Nishihan, F. Golden, A. Hoyt, C. Guss, & M. Kloetzel, Pub. Health Rep., December 1, 1950, 65: 1588.*—(*S. Hadley*)

LABORATORY STUDIES

Drugs and Respiration.—The discovery that the chemoreceptors of the carotid and aortic bodies when stimulated by oxygen want or carbon dioxide excess induce increased breathing made it desirable to investigate their role with regard to the action of certain drugs. It was found that cyanides stimulate respiration mainly via the chemoreceptors, but also, especially in later stages, directly on the center, probably through the formation of lactic acid. Moderate doses of lobeline act exclusively on the chemoreceptors, but the point of attack is central to that of oxygen want or carbon dioxide excess. An intravenous injection of adrenaline leads to decreased respiration or even apnea. This is due to the sudden elimination of the "chemoreceptor drive". The same holds true for acetylcholine after atropinization, though there are differences which can be explained from the fact that acetylcholine also stimulates the carotid and aortic bodies in a similar way to lobeline. Before atropinization the stimulating effect of acetylcholine is enhanced by the simultaneous lowering of the blood pressure, which leads to oxygen want. Local application of eserine to the carotid bodies increases the respiratory response to oxygen deficiency and carbon dioxide accumulation. The sensitivity of the chemoreceptors to these stimuli as well as to lobeline is abolished by local treatment with atropine. These results indicate that acetylcholine is the chemical mediator within the carotid body (Author's summary).—*The action of certain drugs on respiration, G. Liljestrand, Brit. M. J., September 15, 1951, No. 4732: 623.*—(*E. A. Riley*)

Vagus and Respiration.—In anesthetized dogs the vagus nerve was blocked by cocain above the hilum, thereby blocking the vagal afferent fibers from the lungs without interfering with the innervation of the sino-aortic region. When the nerve block was produced, while the chest was closed the frequency of respiration either increased or decreased, depending largely on the anesthetic used and the initial frequency. The amplitude changed inversely with frequency. If the chest was open the frequency always was decreased by vagal block, the amplitude remaining unchanged. In closed and open chest experiments inspiration became slower after block. Arterial pressure remained unchanged. After vagal block, rebreathing of expired air increased the frequency of respiration less than before, but the response returned to normal later. After vagal denervation of the lungs, blocking the cervical vagi frequently caused a diminution in the frequency of respiration. The effects of vagal block, particularly the slowing of inspiration and the diminution in frequency in open-chest experiments, indicate that pulmonary vagal fibers are chiefly excitatory on inspiration. Furthermore, because these effects are largely independent of the mechanical condition of the lungs, it is doubtful that the proprioceptors initiating the Hering-Breuer reflexes alone are responsible for the changes in respiration produced by vagal block (Authors' summary).—*Role of the vagus in the control of respiration, E. Bozler & B. H. Burch, Am. J. Physiol., August 1, 1951, 166: 255.*—(*G. C. Leiner*)

Crossed Phrenic Phenomenon.—In barbiturate-anesthetized animals with spinal hemisections at $C_1 - C_2$, muscle action potentials were recorded simultaneously from each hemidiaphragm during various proce-

dures designed to explain the appearance of increased crossed activity (ipsilateral to the hemisection) following interruption of the direct phrenic nerve (contralateral to the hemisection). The activity of the crossed hemidiaphragm was always less than the activity of the direct hemidiaphragm. Using activity on the direct side as an index of central respiratory discharge, activity on the crossed side was found to vary in a fashion parallel to activity on the direct side during procedures which altered the intensity of the central respiratory discharge. Activity on the crossed side increased following interruption of the direct phrenic nerve during spontaneous uncontrolled ventilation. Qualitative and quantitative recordings revealed that such a change did not occur during controlled artificial ventilation. Central respiratory discharge increased following interruption of the direct phrenic nerve during spontaneous uncontrolled respiration. Such a change did not occur during controlled artificial ventilation. It is concluded that the amount of crossed respiratory activity is directly proportional to the intensity of the central respiratory discharge and is entirely independent of the state of conduction in the direct phrenic nerve. The crossed phrenic phenomenon occurs only when experimental conditions permit an augmentation of central respiratory discharge to take place as a secondary result of interruption of the direct phrenic nerve (Authors' summary).—*Significance of the crossed phrenic phenomenon, L. J. Lewis & J. M. Brookhart, Am. J. Physiol., August 1, 1951, 166: 241.—(G. C. Leiner)*

Heart Response to Arteriovenous Fistulas.—The cardiac output decreases and the blood pressure falls upon digital occlusion of an arteriovenous fistula. This occurs in both otherwise normal dogs and in dogs whose hearts are deprived of sympathetic innervation or even after total interruption of their extrinsic cardiac nerves. The rapid change in cardiac output on opening or closing an arteriovenous fistula is explained according to Starling's law by alteration in the volume input and consequent differences in the stretching of the ventricular fibers. The change in blood pressure would appear to be explainable upon the alterations in peripheral resistance. —*Studies with arteriovenous fistulas: I. Response of the normally innervated and denervated heart to occlusion of the fistula, H. B. Shumaker, Jr., L. W. Freeman, & L. R. Radigan, J. Thoracic Surg., October, 1950, 20: 505.—(R. E. MacQuigg)*

Blood Flow Through Lungs.—The blood flow through each lung was measured in the dog by the Fick principle while the lungs were breathing separately through a bronchospirometric catheter. When one lung was brought into gaseous equilibrium with the pulmonary arterial blood by rebreathing while the other lung continued to breathe air, half the animals showed a well-marked shift of pulmonary blood flow toward the air-breathing lung and away from the rebreathing lung (Authors' summary).—*Reduction of blood flow through the hypoxic lung, R. J. Atwell, J. B. Hickam, W. W. Pryor, & E. B. Page, Am. J. Physiol., July 1, 1951, 166: 37.—(G. C. Leiner)*

Blood Flow Through Atelectatic Lung.—As soon as atelectasis develops, blood flow through that area of the lung is considerably decreased. During the first weeks this decrease has been estimated to be approximately 50 per cent of the normal. As atelectasis ages, there is a continued decrease until practically no blood at all passes the atelectatic parts. In acute atelectasis the pulmonary arteries do not become smaller and the capillary bed remains open, as indicated by simultaneous filling of the pulmonary arteries and veins on both sides during angiocardiography. The arterial oxygen deficit with complete atelectasis of one lung is approximately equal to that when the same lung breathes 100 per cent nitrogen. Thus, the fall in blood flow due to acute atelectasis is of the same order as that due to increased resistance in the capillary bed during breathing of 100 per cent nitrogen. As the atelectasis ages, there is no decrease in the size of the main bronchus of the corresponding

pulmonary artery. It is thought that the blood flow is reduced by a gradual reduction in the capillary bed similar to that in the resting part of other organs. In long-standing atelectasis, the pulmonary artery does decrease somewhat in size.—*The blood flow through an atelectatic lung, V. O. Bjork & E. F. Salen, J. Thoracic Surg., December, 1950, 20: 933.*—(*R. E. MacQuigg*)

Action of Quartz on Rat Lungs.—The chief mechanism for eliminating foreign bodies from the lung alveoli is the lymphatic system. Small amounts of quartz eliminated in this fashion should not produce silicotic lesions in the lung parenchyma but might cause them in the lymph nodes. Larger quantities of quartz might overload the lymphatic drainage system and, being retained in the lung, produce silicosis there. To test the truth of this assertion, 2 mg., 5 mg., 10 mg., 30 mg., and 75 mg. doses of quartz were administered to rats by intratracheal injection. It was found that small amounts of quartz were easily cleared from the lungs by the phagocytes but were ultimately trapped in the tracheobronchial lymph nodes where the progress of fibrosis was more rapid than in the lung parenchyma. With small amounts of quartz, fibrotic nodules first appeared in the lymph nodes. The first irritative and proliferative reaction in the lung itself was around the vessels and bronchi which are rich in lymph vessels. Larger amounts of quartz upset the mechanism of dust dispersal by impairing lymph movement, giving a better chance for particles to accumulate in the lung. Inflammatory changes appeared with the formation of dust granulomas and connective tissue proliferation in the lung tissue. The rate and severity with which quartz acted varied with the amount. —*The action of small amounts of quartz and larger amounts of coal and graphite on the lungs of rats, S. C. Ray, E. J. King, & C. V. Harrison, Brit. J. Indust. Med., April, 1951, 8: 68.*—(*L. Levin*)

Experimental Lye Burns.—Development of a method for producing sub-lethal lye burns and strictures of the esophagus in dogs has shown that the pathologic events following the burn are rather constant. They consist chiefly of edema and congestion of the submucosal layer, thrombosis of submucosal vessels, sloughing of the superficial layers, necrosis of the muscularis, organization and fibrosis on the internal surface of and within the muscularis, and delayed re-epithelization. Bacterial invasion seemed to play a significant role in the pathogenesis of the stricture, and antibiotic therapy should be given early and intensively. Re-epithelization was slow; complete rest of the esophagus may be advisable to hasten this phase and minimize scarring. In view of the inflammatory phase observed during the first week after the burn, dilatation before the tenth day seems illogical and, if vigorously employed, almost certainly will intensify the damage and delay reparative processes.—*The pathology of experimentally produced lye burns and strictures of the esophagus, L. H. Bosher, Jr., T. H. Burford, & L. Ackerman, J. Thoracic Surg., May, 1951, 21: 483.*—(*R. E. MacQuigg*)

Antigen Relationships of *Mycobacteria*.—Using the technique of Middlebrook and Dubos, extracts were made of human, mouse, bovine, and avian strains of *M. tuberculosis*, of Johne's bacillus, and of *M. phlei*. These were believed to be primarily polysaccharide in nature and were used to immunize rabbits. The sera produced and sera from humans suffering from leprosy will agglutinate and, in the presence of complement, lyse sheep red blood cells sensitized with extracts of the phenol insoluble fraction of tubercle bacilli. Cross reactions indicate that the 4 types of tubercle bacilli form a homogenous group, the members of which share only a small proportion of material with *M. phlei*. Johne's bacillus falls into an intermediate group.—*Antigenic relationships of erythrocyte adsorbable fractions of some Mycobacteria, S. Fisher, Australian J. Exper. Biol. & M. Sc., January, 1951, 29: 1.* —(*S. Hadley*)

Rapid Cultivation of *M. Avium*.—The purpose of this investigation was to study the metabolism of *Mycobacterium avium* in the

monooleate-albumin medium. Dibasic organic acids were especially investigated in the hope of developing a medium for rapid assays of antituberculous agents. Modifications of the Dubos medium were inoculated, incubated at 37°C., and the turbidity was then measured. *M. avium* of the Kirchberg strain was maintained in Dubos medium and used throughout. From the results, the following medium is recommended for the cultivation of *M. avium:* sodium phosphate, dibasic anhydrous, 0.63 per cent; potassium phosphate, monobasic, 0.10 per cent; sodium citrate, 0.15 per cent; magnesium sulfate, 0.06 per cent; ammonium succinate, 0.08 per cent; succinic acid, 0.12 per cent; glycerol, 0.20 per cent; and polyoxyethylene sorbitan monooleate, 0.05 per cent. This is sterilized by autoclaving at 15 pounds pressure for fifteen minutes. As in the Dubos medium, a 5 per cent solution of bovine serum albumin in physiologic saline, heated at 55°C. for 35 minutes, and then sterilized by filtration must be added at a concentration of 5 ml. per 100 ml. of medium. Using the above medium, a three-day turbidimetric assay of antituberculous activity is possible.—*A medium for the rapid cultivation of Mycobacterium avium, W. B. Ackart & T. J. Murray, J. Bact., July, 1951, 62: 75.*—(*F. G. Petrik*)

Bacteriology of Sputum.—A total of 1,000 sputa from 594 patients with respiratory tract infections were examined bacteriologically both before and during treatment with antibiotics or chemotherapy. Washing the sputum in three successive baths of sterile physiologic saline solution before culturing usually removed mucus and saliva originating in the upper respiratory tract from the secretion of the smaller bronchi. The following media were used to culture the bronchial secretions in each case: (*1*) blood agar, (*2*) blood agar with penicillin, (*3*) Levinthal's blood agar, (*4*) Levinthal's blood agar with penicillin, (*5*) Clauberg's medium, (*6*) Endo agar, (*7*) glucose broth, and (*8*) liver broth. Bacteria that developed at least 20 colonies were considered to originate in the smaller bronchi. The type of epithelial cells accompanying the bacteria on slides of direct sputum smears stained with Gram or methylene blue reagents helped to determine the origin of the bacteria. The various types of *Streptococci* were found most frequently, with *Micrococcus catarrhalis* and pneumococci also occurring often. Influenza bacilli were more frequently found in cases of bronchiectasis. Tubercle bacilli always were looked for and, if the smear was positive, culture and animal inoculation was made to differentiate the nonpathogenic acid-fast bacilli which occur frequently in cases of bronchiectasis and gangrene. While the cultural studies of the sputum did not permit definite conclusions as to the nature of the process, they gave useful indications as to the presence of bacteria susceptible or resistant to the various chemotherapeutic and antibiotic agents. —*Die bakteriologische Sputumuntersuchung und deren Bedeutung für die Erkrankungen der Atmungswege, W. Thurner, Deutsche med. Wchnschr., November 3, 1950, No. 44: 1468.*—(*L. Molnar*)

PUBLIC HEALTH AND EPIDEMIOLOGY

Tuberculosis from Animals.—Opportunities for the transmission of tuberculosis from animals to man and from man to animals are afforded by contact between handlers or consumers and food animals or animal products. Many pets are susceptible to tuberculosis, often live in rooms with their masters, and are in close contact with them during play. Adequate control or elimination of tuberculosis is dependent on its control and elimination in all species which harbor readily transmissible tubercle bacilli. Raw or improperly pasteurized milk from tuberculous cattle is the most important factor in the transmission of bovine tuberculosis to human beings, but infection may be acquired by inhaling organisms from infected cattle or through abrasions of the skin. Bovine tubercle bacilli may be transmitted to swine through feeding the latter unpasteurized skimmed milk from tuberculous cattle. Such swine may then infect human beings. Tuberculous human beings may infect cattle; human tubercle bacilli usually cause a disease in cattle which is limited in extent and does not become

progressively disseminated. Tuberculosis in cattle has been reduced since 1917 from an incidence of 5 per cent to less than 0.19 per cent. Avian tuberculosis is widespread among chickens in the agricultural areas of north central United States. In several states, more than 50 per cent of the farm flocks are tuberculous, causing serious loss to the poultry industry. The infection is readily transmitted to other domestic fowl and to swine. The small number of adequately proved infections with avian tubercle bacilli in man indicates that these bacteria have a low pathogenicity for human beings although they can produce disease. Dogs are susceptible to both bovine and human tubercle bacilli, most canine infections probably being caused by human strains. The disease in dogs frequently attacks the lungs and is especially dangerous to children who fondle the pets. Obviously tuberculous dogs should be destroyed. Tuberculosis among cats is rare in the United States because of the marked resistance which these animals have to human tubercle bacilli. Cats, however, are susceptible to infection with the bovine strain. Monkeys are readily infected by both human and bovine tubercle bacilli. In this country, it is probable that most tuberculosis in monkeys is of human origin. In these animals the disease takes a rapidly progressive course with large cavitary pulmonary lesions. Tuberculous monkeys disseminate their disease to other monkeys and to man by coughing, which they do freely. Parrots also are susceptible to infection with human tubercle bacilli and may be sources of infection to man.—*Tuberculosis of animals, A. G. Karlson, J. Am. Vet. M. A., August, 1951, 119: 108.*—(*L. Hyde*)

Eradication of Bovine Tuberculosis in the Netherlands.—On May 20, 1951, the Netherlands Government began a five-year program to eradicate tuberculosis from the country's dairy herds. It is estimated that there are some 450,000 positive tuberculin reactors among 2,500,000 cattle. Infected animals will be slaughtered, and the owners reimbursed. The program will cost approximately 100,000,000 florins for slaughter premiums alone, half of which will be supplied from Marshall Plan counterfunds and the remainder by contributions from the dairy industry.—*Het 5-Jaren Plan voor de T.B.C.-bestrijding onder het Rundvee in Nederland, J. M. van den Born, Maandblad voor de Landbouwvoorlichtingsdienst, June, 1951, 8: 217.*—(*J. van der Vate*)

BCG Vaccination of Infants.—Among 1,461 newborn infants vaccinated with BCG during the first week of life, 1,015 became Mantoux-positive. All vaccinations were done intradermally. Contrary to reports that newborn infants are insensitive to BCG and that twice the adult dose is needed to produce conversion, it was found that 0.1 ml. of vaccine, the ordinary adult dose, was effective in producing conversion. The shortest conversion time was sixteen days and all babies tested had converted within ten weeks, the conversion time varying with the dose given. The strength of OT to which these babies reacted varied inversely to the extent of the reaction at the vaccination site. No systemic reactions of any kind were encountered. Ulceration at the site of vaccination was common; regional adenopathy was frequently noted. Fluctuation or breakdown of the involved node was seen 50 times, 47 times in the inguinal region and 3 times in the axilla, always in babies who received a 0.2 ml. injection. Because of the frequency of this complication, the use of thigh injections was eventually abandoned and the vaccination dose was reduced to 0.1 ml. Local use of a sulfathiozole powder containing streptomycin and the local injection of 10,000 to 20,000 units of streptomycin expedited the resolution of the adenitis which often did not become evident for some weeks after the post-vaccination Mantoux test.—*BCG vaccination in the newborn: Preliminary report, W. Gaisford & M. Griffiths, Brit. M. J., September 22, 1951, No. 4733: 702.*—(*E. A. Riley*)

Infection and Morbidity.—In 1947–1948, 76 per cent of the students at Strassbourg

University were tuberculin-positive. This percentage declined to 69 in 1949–1950. Of 100 students classified according to their year of birth, the infection rate ranged from 94 per cent in 1947–1948 for those born in 1922 to 49 per cent in 1949–1950 for those born in 1931. From 70 to 80 per cent of all non-reactors accepted BCG vaccination. The infection rate of male students of all the faculties except Medicine was higher than the infection rate of female students. From 1947 to 1950, 81 to 71 per cent of the men converted, as compared with 65 to 60 per cent of the women. More women refused BCG vaccination for esthetic reasons, but the group of non-reactors was reduced by vaccination. The annual increment of infection was 17 per cent for men and 12 per cent for women. One woman developed pleurisy at the time of conversion. Among a total of 562 medical students, the infection rate remained 77 per cent during 1947–1950. In a total of 39 observation years, 26 non-reactors had 10 conversions, 3 of which were accompanied by pulmonary infiltrations. The annual increment of infection was as high as 25 per cent. BCG vaccination was particularly encouraged among medical students. Periodic rechecks of tuberculin sensitivity disclosed 15 reversions from an originally positive to a negative reaction. Among 1,376 tuberculin-positive medical students, there were 10 cases of active tuberculosis (0.73 per cent); the incidence was 7 per cent in non-reactors and 0.26 per cent in 379 BCG-vaccinated medical students. Students of the faculties except Medicine had a morbidity of 0.41 per cent among the reactors, 0.19 per cent among the non-reactors, and none for the BCG-vaccinated students.—*Tuberculisation et morbidité tuberculeuse chez les étudiants de l'Université de Strassbourg durant les trois dernières années scolaires, E. Vaucher & P. Oudet, Rev. de la tubere., 1951,* ***15:*** *215.—(V. Leites)*

Tuberculin Allergy.—Tuberculin tests were performed on 4,200 Danish farm children representing 728 families and 61 sets of twins before, and ten weeks after, BCG vaccination. The results were subjected to rigorous statistical treatment. The groups of twins were used to establish a baseline to cancel out experimental errors, as in this group biological differences were considered to be zero. The study was set up to evaluate the role of familial factors in sensitivity to tuberculosis and the biological differences between brothers and sisters gave a variance as high as 3.1. The value of the variance increased to 5.4 when children of different families were compared. The Danish population is considered to be very homogenous, so that greater differences are anticipated in other population groups.—*Research contributions of BCG vaccination programs: I. Tuberculin allergy as a family trait, C. Palmer & S. Meyer, Pub. Health Rep., March 2, 1951,* ***66:*** *259.—(S. Hadley)*

Periodic Examination for Pneumoconiosis.—Since it is impracticable to suppress all airborne dust in mines, and safe levels of dustiness are not yet known, periodic medical examinations of coal miners would most quickly and economically prevent pneumoconiosis. (*1*) It would immediately protect the men before safe dust levels are defined and dust is suppressed effectively. (*2*) It would reveal the mines, seams, or districts where early signs of the disease still arise in spite of dust suppression. (*3*) Combining periodic examinations with routine dust studies should in time demonstrate the dangerous level of dustiness. Simple pneumoconiosis differs from progressive massive fibrosis. Radiologically the former is seen as the gradual appearance of characteristic minute opacities; the latter, as massive shadows. It was found in this study that excessive breathlessness on effort, the main disability in pneumoconiosis, was not caused by a marked increase in the ventilatory requirements for a given amount of exercise but by a decrease in the ventilatory reserve. Reduction in the maximal breathing capacity was the best simple index of this lowered reserve. Young men, even with advanced simple pneumoconiosis, were not seriously disabled; men with progressive massive fibrosis were usually mark-

edly disabled and their disability increased with age and the amount of progressive massive fibrosis. Once a man had a certain amount of simple pneumoconiosis, his chance of developing massive fibrosis was independent of further dust exposure; massive fibrosis was nearly always progressive. If a man were removed from further exposure when he had only a little simple pneumoconiosis, he was unlikely to develop progressive massive fibrosis. Once a man had extensive pneumoconiosis, progressive massive fibrosis developed with equal likelihood whether or not he was further exposed. Once started, massive fibrosis nearly always progressed, though at widely varying rates. Periodic examination of coal workers would be of value both to the miners and to the industry. Men, especially if they were young, would have to leave the industry or change their occupation only if early simple pneumoconiosis were found on serial examinations to be advancing or if there were more advanced radiologic changes which were becoming disabling.—*The role of periodic examination in the prevention of coalworkers' pneumoconiosis, A. L. Cochrane, C. M. Fletcher, J. C. Gilson, and P. Hugh-Jones, Brit. J. Indust. Med., April, 1951, 8: 53.*—(*L. Levin*)

Bacterial Contamination of Air.—The total number of viable bacteria present in the air of occupied places has been advocated as a possible index of the degree of pollution of the air with pathogenic bacteria. Analysis of the tuberculosis data from the boot and shoe factories in Northampton showed that tuberculosis was more prevalent in the large than in the small factories; there was an increase in the bacterial count with an increase in factory size. There also proved to be a positive correlation between bacterial count and the number of workers. Another factor of importance was the differences in age, structure, and ventilation of the various factories. There was a significant difference between the various departments in the same factory. Considerably more work would be needed to define the relationship between the level of bacterial pollution of air and the incidence of tuberculosis; but the two indices did run parallel within this study.—*Bacterial contamination of the air in boot and shoe factories, A. Hirch, Brit. J. Indust. Med., January, 1951, 8: 8.*—(*L. Levin*)

THE AMERICAN REVIEW OF TUBERCULOSIS

ABSTRACTS

Edited by LAWRENCE B. HOBSON

VOLUME 65 MARCH, 1952 ABST. NO. 3

CLINICAL STUDIES, TUBERCULOSIS

Cortisone and Miliary Tuberculosis.—A case of acute miliary tuberculosis in a patient receiving cortisone for a chronic febrile illness with arthritic manifestations is reported. He received 100 mg. of cortisone intramuscularly daily in 3 courses which totaled seventy-two days. The patient died suddenly four weeks after the discontinuance of his third course of cortisone. The autopsy disclosed acute miliary tuberculosis of the lungs, peribronchial lymph nodes, liver, spleen, and adrenals. The mechanism of action of cortisone in producing a spread of tuberculosis is not known. Interference with granulation tissue formation would seem of primary importance. Modification of the immunologic mechanism may also be of significance, as adrenal hormones are capable of inhibiting tuberculin-type reactions. It is believed that, through inhibition of tissue hypersensitivity, adrenal steroids may either ameliorate the severity, or facilitate the spread, of established tuberculous infection and that it is not yet safe to predict which action will predominate in a given case of tuberculosis. In any event, administration of cortisone to patients with active tuberculosis should be withheld until further evidence is available.—*Miliary tuberculosis in a cortisone-treated patient: Case report with autopsy, R. F. Kleinschmidt & J. M. Johnston, Ann. Int. Med., September, 1951, 35: 694.*—(*T. H. Noehren*)

Tuberculoma of the Lung.—Pulmonary tuberculoma is defined as a rouned homogeneous radiographic opacity of a tuberculous nature with well-defined borders, 1.0 cm. or more in diameter. Three pathologic patterns are represented: (*1*) post-primary caseous pneumonia, (*2*) inspissated cavity, and (*3*) primary focus. A total of 41 cases were reviewed; in 29, the tuberculoma was the sole original abnormality, while in 12 others minimal disease was present elsewhere in the lung. The age of the patients ranged from 15 to 51 years, with an average of 29 years. The proportion of women to men was approximately two to one. In 17 cases, a family or contact history of pulmonary tuberculosis was obtained. There was a history of antecedent pleurisy in 5 patients; 14 were symptom free. Hemoptysis and pleural pain were the most frequent complaints of the others. The average duration of ill health was six months. Only 7 patients had a "positive" sputum; 11 were negative but subsequently became "positive." A negative Mantoux test was evidence against, but did not exclude, tuberculoma. The sedimentation rate usually was normal. Radiographically, the lesions were single or multiple, ranging in size from 1 to 5 cm. in diameter, and of variable density. The features of greatest diagnostic importance were: (*1*) satellite shadows, (*2*) calcification, and (*3*) cavitation. Tomography was necessary to ascertain the presence or absence of these features. Segmental atelectasis was uncommon. Cavitation took the form of single or multiple translucencies of smooth outline and often was eccentric; no fluid level was seen. In the differential diagnosis, the following conditions had to be considered: bronchogenic carcinoma, neoplastic metastases, lung abscess, pneumonia, encapsulated pleural effusion or empyema, congenital and acquired cysts, coccidioidomycosis, gumma, adenoma, hemangioma, hamartoma, pleural fibroma, and neurofibroma. Bronchogenic carcinoma has a predilection for older men, associated atelectasis is more common, and, when cavitated, the walls are more irregular and a fluid level is frequently seen. Calcification, satellite infiltration, and

"positive" sputum virtually exclude the diagnosis of carcinoma. Neither hilar adenopathy nor increase in size is proof of neoplasm. Bronchoscopy rarely is contributory. Of the 41 patients, 34 received relatively conservative treatment or none at all. There were no deaths. At the end of three to fifteen years of observation, 31 patients (91 per cent) were in good health; 3 had active tuberculosis. However, 17 showed evidence of activity at some time during the course. Bronchogenic spread, when it occurred, was peculiarly benign. In this series, 7 patients were considered inactive and not in need of further treatment; 16 patients received bed rest only, 7 received pneumothorax, and 3, phrenic interruption with uniformly good results. One patient received streptomycin with a good result; most of the cases were seen in the pre-streptomycin era. Thoracoplasty was not considered justified. Resection was performed in 7 cases, the reason being diagnostic error in 5 of them. There was one operative death. The other patients are all well. The author does not share the current enthusiasm for resection. Although many patients exhibit activity during their course, this is rarely of the explosive variety and responds well to more conservative forms of therapy.—*Tuberculoma of the lung, E. N. Noyes, Thorax, September, 1951, 6: 238.*—(*A. G. Cohen*)

Secondary Tuberculous Enteritis.—Among 223 necropsies in tuberculosis patients at a Sao Paulo hospital, only one case of primary tuberculosis of the small intestine was found by Amorim, as compared to 55 per cent of "secondary" enteric tuberculosis. In 60 per cent of the latter, both large and small intestines were involved; in 27.6 per cent only the small intestine, and in 13.2 per cent only the large. Only one case (0.44 per cent) of tuberculous duodenal ulcer was detected. In none of the necropsies was an ileocecal tuberculoma found. Judging from the symptoms present in 122 patients with pulmonary tuberculosis in the same institution, the clinical diagnosis of tuberculous enteritis is rather difficult. A persistent diarrhea, ileocecal pain, intestinal hemorrhages with fever, and rapid physical deterioration are suggestive. Clinical, laboratory, and roentgenographic findings agree in about 80 per cent of cases. Among 20 patients with pulmonary tuberculosis selected for a more thorough study, in 11 a presumptive diagnosis of intestinal tuberculosis seemed justified. The intestinal flora in 80 per cent of these patients gave an acid reaction. Before the advent of streptomycin and PAS, 78 per cent of the patients in the hospital showed symptoms connected with the intestine. This rate has recently dropped to 23.4 per cent, probably because of these new factors.—*Enterite tuberculosa, J. Ramos, F. Cintra do Prado, & L. C. Fonseca, Rev. brasil. med., June, 1951, 8: 389.*—(*A. A. Moll*)

Rare Localizations of Tuberculosis in Bones.—Among 1,157 cases of osseous tuberculosis were one case in the corpus mandibula, 4 in the os pubis, 4 in the os ischium, and 19 cases of tuberculous lesions in the major trochanter. Demonstration of tubercle bacilli, a positive tuberculin reaction, and elimination of possible tumors or chronic nontuberculous infections are necessary for the diagnosis.—*A contribution to rare localizations of tuberculosis in bones, A. Manzoni, Tuberkuloza, Beograd, May, 1951, 3: 1-2, 34.*—(*J. Ilavksy*)

Genital Tuberculosis.—Among 25 patients with pulmonary tuberculosis examined for genital involvement, 6 were found to have genital tuberculosis; there was endometrial involvement in 5 patients. Streptomycin, 1.0 gm., and *p*-aminosalicylic acid, 15.0 gm., were given daily for ninety days to 4 patients, and also to the other 2 for a shorter period. In 3 patients a panhysterectomy was eventually performed with perfect safety. In the other 3, clinical remission was achieved without operation. Drug therapy usually will cure endometrial disease but is ineffective in tuboovarian involvement except to facilitate the safe performance of surgery.—*Genital tuberculosis with pulmonary involvement, D. T. O'Driscoll, Lancet, September 15, 1951, 2: 476.*—(*A. G. Cohen*)

Pleural Effusion in Pneumothorax.—Of 2,981 patients admitted to a French student sanatorium between 1933 and 1949, 2,134 were treated with pneumothorax. These patients were observed from one and one-half to sixteen years, follow-up information being obtained in 98 per cent of the cases. None of these patients received antibiotic therapy. Among 2,570 pneumothoraces, including bilateral collapse, pleural effusion occurred in 786 cases. Of these, 54 cases were eliminated because the fluid was purulent from the onset. In the remaining 732 cases the fluid was initially serous; it became purulent in 20 per cent. The total incidence of pleural effusion, exclusive of primary empyema, was 28 per cent. The highest incidence for the development of fluid was during the third month of pneumothorax; 25 per cent of all effusions appeared between the first and third month. Of 2,154 pneumothorax cases 416 were bilateral; of these, 10 per cent had bilateral pleural effusion. In 75 per cent of bilateral effusions, the interval between the induction of pneumothorax and the appearance of the exudate was the same on each side. The maximal incidence of effusions was in December, the minimal in August; 18 per cent of the pleural effusions occurring in summer, 33 per cent in winter. Only 6 per cent of all effusions developed immediately following an acute intercurrent illness. Overexertion, interruption of the rest regimen, and trips preceded the effusion in 20 per cent of the patients. Only 5 per cent had active extrapulmonary tuberculosis at the time of the pleurisy. Of the 2,570 pneumothoraces, intrapleural pneumonolysis was done in 1,181 resulting in 809 cases of complete and 372 cases of partial pneumothorax. Pneumonolysis was followed by pleural effusion in 23 per cent of the cases. This does not include those patients with bronchopleural fistula and primary empyema. Complete pneumothorax was complicated by effusion in 18 per cent of the cases, partial pneumothorax in 43 per cent. Also, 86 per cent of the pleural effusions occurred in extensive and cavitary lesions, a third of which were located at the periphery. The contralateral lung was normal in half of the cases of effusion. In 25 per cent of the patients with an initially uninvolved lung, contralateral disease developed in the course of pleurisy. Among the 732 cases of pleural effusion, 21 per cent became purulent; this represents 6 per cent of all pneumothorax cases. Adding the cases which had purulent exudate from the onset, the total incidence of empyema in this series is 8 per cent. Two-thirds of the cases of "secondary" empyema developed in patients with partial pneumothorax of the "dangerous" type. In almost half of the cases, the purulent transformation of fluid occurred within the first three months. The mortality in these cases was 33 per cent; it was 10 per cent in the group of 570 patients with serofibrinous exudate. In half of the cases of serofibrinous fluid, a dry pneumothorax space could be re-established. The duration of fluid was up to three months in 37 per cent; three to six months in 22 per cent; six months to one year in 23 per cent; more than one year in 18 per cent. The results after re-establishment of a dry pneumothorax were satisfactory in 85 per cent; relapse occurred in 15 per cent. Obliteration of the pleural space occurred in 42 per cent of the cases less than a year after disappearance of fluid. The current pulmonary status is good in 42 per cent, fair in 19 per cent, and poor in 39 per cent. When pneumothorax could be maintained one to two years after absorption of fluid and obliteration of the space occurred relatively late (21 per cent), the pulmonary result was good in 65 per cent, fair in 19 per cent, and poor in 16 per cent. If obliteration of the pneumothorax space developed two to five years after absorption of fluid (38 per cent) the pulmonary result was good in 75 per cent, fair in 14 per cent, and poor in 11 per cent. In 38 per cent of the cases there were no roentgenographic sequelae after the disappearance of fluid. No exact functional tests were carried out in this series; 15 per cent of the patients subsequently had dyspnea and tachycardia. Ten patients (1.7 per cent) died of respiratory insufficiency. All other patients lead a practically normal life; none, however, performs manual labor. With an

observation period from eighteen months to sixteen years pneumothorax complicated by pleural effusion produced good results in 56 per cent of cases by clinical, roentgenologic, and bacteriologic criteria, and poor results in 44 per cent with death, chronicity, or relapse. Pneumothorax without pleural effusion gave 76 per cent of cures. Premature interruption of collapse therapy due to obliteration of the space after effusion was responsible for 63 per cent of relapses in 192 cases; whereas in 295 cases, pneumothorax resumed for a sufficient period after absorption of fluid gave 85 per cent of good results and 15 per cent of relapses after re-expansion.—*Conditions d'apparition et avenir des 732 épanchements sero-fibrineux du pneumothorax observées chez malades du Sanatorium des Étudiants de Saint Hilaire-du-Touvet de 1939 a 1949, D. Douady, R. Cohen, D. Neel, & P. Pasquier, Rev. de la tuberc., 1951, 15: 393.—(V. Leites)*

Spontaneous Pneumoperitoneum During Artificial Pneumothorax.—A young man underwent a right phrenic interruption followed by pneumoperitoneum. Two months later, right pneumothorax was begun, supplemented by a pneumonolysis. The pneumoperitoneum was then abandoned and a right phrenic avulsion was done. The pneumothorax had been continued for six months at the time of the accident. Approximately five hours after the refill, the patient experienced a sudden tearing sensation in the abdomen. Fluoroscopy showed the pneumothorax to have become shallow; air was seen beneath the diaphragm. The pneumoperitoneum eventually absorbed, and the pneumothorax was continued without complications. In the only 2 previously reported similar cases, the refills had been given with positive pressure. This had not been done in this case. It is assumed that a congenital defect in the diaphragm probably existed. This was aggravated by the atrophy which resulted from the phrenic interruption.—*The development of a spontaneous pneumoperitoneum during artificial pneumothorax therapy, A. W. Anderson & R. Grenville-Mathers, Brit. J. Tuberc., July, 1951, 45: 129.—(A. G. Cohen)*

Pneumoperitoneum for Advanced Tuberculosis.—A series of 122 patients with pulmonary tuberculosis, including 81.1 per cent of far advanced cases and 16.4 per cent of moderately advanced cases, were treated recently with pneumoperitoneum for a minimum of three months at the Santa Maria Sanatorium near Rio de Janeiro. In 49 patients, this was the only treatment. Results showed 4.9 per cent clinically cured, 4 per cent probably clinically cured, 38.6 per cent roentgenologically improved, 23 per cent arrested, 13.1 per cent grown worse, and 16.4 per cent dead. This compares favorably with results secured in 1,409 patients, including 72.8 per cent of far advanced cases, treated during the three years preceding August 1948. Pneumoperitoneum was used only in 11 patients of this previous series. The difference was especially apparent in the roentgenologically improved groups (22.4 per cent against 10 per cent) and in the death rate (16.4 per cent against 39 per cent). In the cases receiving pneumoperitoneum alone, only probable clinical cures, totaling 4 per cent, were recorded as compared to 8.3 per cent of actual or probable clinical cures in the larger group. Roentgenologic improvement and mortality figures were, however, much better among the former. When streptomycin was used with pneumoperitoneum, results were twice as good as with pneumoperitoneum alone. At the Sanatorium, with over 70 per cent of far advanced cases in its population until very recently, pneumoperitoneum and streptomycin therapy have substantially improved the outlook. The death rate has decreased from 39 per cent in the 1945 to 1948 period to 31.6 in 1949 and 26.2 in the first semester of 1950. The length of the patients' average stay has also practically doubled during that period, from four months and twenty-four days to nine months. Recent therapeutic advances suggest caution

in the routine use of phrenic interruption operations when a thoracoplasty is anticipated.—*Tratamento das formas avançadas de tuberculose pulmonar pelo pneumoperitônio, F. Poppe de Figuereido, J. L. Monteiro da Franca, & G. Fraga filho, Rev. brasil. tuberc., September-October, 1950, 18: 513.*—(*A. A. Moll*)

Subdiaphragmatic Hematocele in Pneumoperitoneum.—In the course of fluoroscopy prior to giving a pneumoperitoneum refill, a dense rounded shadow on top of the liver was seen. By positioning, this was found to be located anteriorly between the right diaphragm and liver. It was decided that the shadow represented a hematoma. Peritoneoscopy showed an extraperitoneal collection of blood. Refills had been given with the patient in a lateral recumbent position. The needle had been inserted one to two finger-breadths below the costal margin. The needle must have been directed incorrectly so that its point perforated the peritoneal lining of the diaphragm, pricked the lower surface of the diaphragm, and damaged a blood vessel. The blood, oozing from the puncture hole, had separated the peritoneum from the diaphragm and collected between the diaphragm and the peritoneum.—*Subdiaphragmatic haematocele due to pneumoperitoneum, E. G. W. Hoffstaedt, Thorax, September, 1951, 6: 310.*—(*A. G. Cohen*)

Pulmonary Resection for Tuberculosis.—Prior to 1945, the early or late mortality rate was one in every 4 patients on whom lobectomy was performed for pulmonary tuberculosis. The major complications of spread or reactivation of the disease postoperatively were variously reported as 20 to 60 per cent; of empyema, 15 to 25 per cent; and of bronchopleural fistula, 15 to 20 per cent. In the recent experience at Fitzsimons General Hospital in Denver, Colorado, there have been only 2 deaths among 94 consecutive patients on whom lobectomy has been performed for pulmonary tuberculosis. Reactivation or spread of the disease has occurred in 5 patients, empyema in 2, and bronchopleural fistulas in 5. In an over-all summary of 124 patients on whom pulmonary excision has been performed for the treatment of pulmonary tuberculosis, including pneumonectomy, segmental or partial resection of a lobe, or total lobectomy, the mortality rate, both early and late, has been 4 per cent. These striking improvements are attributable to several developments. The common denominator not previously available has been streptomycin. This antibiotic and the more recent combined therapy with *p*-aminosalicylic acid have been the most important factors in the improvement. Final evaluation must await the experience of a long-term follow-up study.—*Recent advances in pulmonary resection in the treatment of tuberculosis, J. H. Forsee, C. W. Tempel, & J. M. Salyer, Ann. Int. Med., August, 1951, 35: 417.*—(*T. H. Noehren*)

Thoracoplasty for Lower Lobe Tuberculosis.—In a series of 152 cases of tuberculosis in which thoracoplasty was performed, cavities in the apical segment of the lower lobe of the operated side were found in 34. In 4, the disease was confined to the lower lobe; in the other cases, cavities were found in the upper lobe also. In 6, there was also disease in the contralateral lung. In the 4 cases of exclusively lower lobe disease, cavity closure and negative sputum were obtained in all. In the other 30 cases, this result was achieved in 22; the sputum remained positive in 4, and 4 patients died. The author performed a wide perivertebral mobilization of the lung. At the present time, he would perform segmental resection or lobectomy for disease confined to the lower lobe. If the disease is bilobar, he would perform thoracoplasty, particularly if there appears to be considerable sound lung tissue in the lower lobe or if there is contralateral disease.—*Thoracoplasty and cavitation of the apical segment of the lower lobe, H. J. Beard, Tubercle, July, 1951, 32: 142.*—(*A. G. Cohen*)

Extrapleural Pneumonolysis.—On the basis of a series of 224 extrapleural pneumonolyses, it seems apparent that the only cases suitable for operation are those which present the "absolute indication" of Schmidt, namely, a small cavity centrally in the upper lobe when an intrapleural pneumothorax is not possible, conservative therapy is unsuccessful, and function of the lungs is good. Among the "relative indications" of Schmidt, the only valid one is that of bilateral lesions when pneumothorax is indicated but impossible intrapleurally. Subtotal liberation of the lung, especially anteriorly, is important in order to obtain a concentric collapse of all of the segments of the upper lobe. Prevention of complications is also important and includes careful preoperative preparation, careful electrocoagulation during the operation, lavage of the thoracic cavity with warm physiologic saline solution containing adrenaline, and prophylactic applications of penicillin and streptomycin. In 4 cases, paresis of the phrenic nerve was observed. This may be caused by mechanical damage when strong adhesions have to be broken or by electrocoagulation of the vessels near the nerve.—*Our experience with extrapleural pneumonolysis, K. Siska, Rozhl. tuberk., December, 1950, 10: 5–6, 96.*—(*J. Ilavsky*)

Extrapleural Pneumothorax.—The previous causes of failure of extrapleural pneumothorax were: (*1*) failure to control the tuberculous lesion, (*2*) early postoperative shock and dyspnea, (*3*) filling with blood clot and eventual loss of the space, (*4*) pyogenic infection of space, and (5) tuberculous infection of space. These resulted from inadequate operations, non-uniformity of refill technique, and poor selection of cases. The author reports 47 cases, with one death. Two patients required subsequent thoracoplasty because of space infection; 2 others developed complications. The other 42 patients were well up to four years after operation; all had negative sputum. In the selection and treatment of cases, the following considerations apply: (*1*) Exclude lesions which could be treated better with other measures, namely, destroyed lung, bronchial disease, thick-walled cavities, and extensive lower lobe disease. (*2*) With postural drainage, the cavity should become smaller. (*3*) Precede operation with a period of bed rest and usually the administration of streptomycin or *p*-aminosalicylic acid. The following technical features are emphasized: (*1*) Approximately the thirteenth day, perform open reoperation and clean out the clot. (*2*) Avoid shock by means of temporary polythene pack. (*3*) Avoid necessity for refills by means of periosteomuscular flap.—*Extrapleural pneumothorax, D. Barlow, Tubercle, September, 1951, 32: 186.*—(*A. G. Cohen*)

Polythene Packs for Tuberculosis.—Attempts have been made in the past to eliminate the shortcomings of thoracoplasty by extrapleural plombage. The use of unyielding substances such as Lucite has not been satisfactory. After considerable experimental work, the idea of using polythene bags filled with strips of polythene sheeting was evolved. This pack is firm and resilient and can be molded to the shape of the space to be filled. Apical and basal packs differ in size and shape. The operation entails stripping of the parietal pleura together with the intercostal muscles and periosteum from the inner surface of the first five ribs, or of six to nine ribs according to the extent of the disease. The pack is then inserted. A total of 102 operations was performed on 97 patients (bilateral in 5). In 72 of the 92 cases with upper lobe disease, the operation was successful, resulting in cavity closure and negative sputum. In 5 cases with cavities at the apex of the lower lobe, it was a failure. Two deaths occurred later, both from nontuberculous causes. It was necessary to remove the pack in 17 cases, chiefly for sepsis. Experience has shown that cavities in the lower lobe, tension cavities, thick-walled cavities, and tuberculomas are unsuitable for this operation.—*The polythene pack operation for pulmonary*

tuberculosis, H. M. Davies, L. J. Temple, & C. Stathatos, Thorax, September, 1951, 6: 209.—(A. G. Cohen)

CLINICAL STUDIES, NONTUBERCULOUS DISEASES

Beryllium Intoxication.—More than 100 cases of pulmonary granulomatosis and more than 200 cases of acute pneumonitis have occurred during the past several years among individuals exposed to beryllium and its compounds. Because many of the characteristics of berylliosis differ from those of common chemical intoxications, the following is suggested as the probable causative mechanism. Berylliosis is more readily understandable on the hypothesis that the essential mechanism is a modified immunologic reaction. The important premises are: (*1*) In the body, beryllium combines with protein to form an antigen which in turn stimulates a beryllium-specific antibody. An inflammation results from the subsequent reaction of beryllium and this specific antibody. (*2*) This reaction exhibits a high degree of organ specificity. When the antibody excitation occurs in the skin, the skin is the shock tissue and develops the inflammatory reaction on subsequent beryllium insult. There is an abundance of clinical and experimental data to substantiate this. By analogy, the beryllium in the lung stimulates antibody production in that organ; and with the lung as the shock tissue, further beryllium insult results in inflammation. (*3*) With beryllium, particularly beryllium oxide, retained in the lung in immunologically significant quantities for very long periods, once a "shock" response has begun, it will continue with a severity dependent on the degree of sensitization of the tissue, on the rate at which beryllium is released from the tissue deposit, and on the quantity released. A corollary is that the beryllium oxide produces little or no effect until the tissue becomes sensitized and, since sensitization may occur in some cases only after prolonged contact, the delay between termination of work exposing to beryllium and the onset of symptoms is satisfactorily explained. (*4*) With the degree of sensitization an important variable in the pathogenesis of the lesion, the disparity between the lung content of beryllium and the severity of the lung lesion becomes understandable. (*5*) The granuloma, the distinctive lesion in all of these manifestations, is now accepted as a characteristic pathologic feature of a chronic allergic reaction. The concept that soluble beryllium is slowly and constantly released from the tissue deposits of beryllium oxide is consistent with the dynamics of granuloma formation in other chronic allergic states. (*6*) Other tissues in which small deposits of beryllium may be found can exhibit the antigen-antibody reaction. This readily explains the presence of granulomas in the liver, the skin, and other organs of individuals with berylliosis. It is significant that the skin granulomas occurring in the cases of berylliosis were not noted prior to the onset of the disease but developed concurrently with the pulmonary symptoms. (*7*) The variable systemic manifestations of berylliosis, not easily explained by the degree of lung involvement, may well be due to immunotoxic reactions in other tissues. (*8*) The peculiar incidence of the chronic beryllium disease finds a parallel only in other well-recognized acquired sensitization or allergic diseases. (*9*) The failure to reproduce the disease in animals may be explained by the well-recognized species differences in the capacity to develop immunologic phenomena, with man exhibiting a degree of hyperreactivity not found in lower forms.—*Epidemiology of beryllium intoxication, J. H. Sterner & M. Eisenbud, A. M. A. Arch. Indust. Hyg. & Occup. Med., August, 1951, 4: 123.—(T. H. Noehren)*

Aluminum Lung.—The observation that pulmonary changes occur in workers in aluminum industries prompted the examination of 97 workers in an industrial plant which manufactured aluminum alloys during the war. Three cases of pulmonary tuber-

culosis occurred in workers employed in different operations. All other individuals showing pulmonary lesions belonged to the group of 36 workers directly exposed to the toxic fumes given off in a smelting process requiring temperatures ranging from 1,200° to 1,300°. In this latter group there were 4 cases of severe pulmonary cirrhosis, one of which was associated with tuberculosis; one case of moderate fibrosis; 8 cases of more or less pronounced pneumoconiosis; and 5 cases of tuberculosis in which no pulmonary fibrosis could be demonstrated. All workers with pathologic findings had been exposed to the fumes for periods of three to eight years. The clinical picture was in most cases characterized by severe impairment in the respiratory function in contrast with the relatively modest radiologic findings. The widening of the mediastinum characteristic of other types of "aluminum lung" was observed in most of these cases. There was, however, one case without hilar involvement but with diffuse mottling in the lung fields.—*Eine neuerliche Erweiterung der Aluminose, H. Mödder & T. Schmitt, Deutsche med. Wchnschr., January 19, 1951, No. 3: 84.*—(*L. Molnar*)

Human Respiratory Newcastle Disease.—A laboratory worker was accidentally exposed to Newcastle disease virus in vaporized particles 5 to 10μ in size and containing 0.0002 cc. or less of infected embryonic fluid per liter of air. The man's eyes were protected but four days later he felt slightly ill with chilliness, anorexia, headache, sore throat, slight unproductive cough, aching joints, fatigue, and insomnia. Two days later he had a temperature of 100°F. Newcastle disease virus was recovered from his sputum. Heretofore only conjunctivitis has been attributed to this virus in men accidentally exposed to it in high concentrations.—*Note on the infection of a person with Newcastle disease virus, C. A. Mitchell & V. L. Walker, Canad. J. Comp. Med. & Vet. Sc., September, 1951, 15: 226.*—(*L. B. Hobson*)

Salmonella Senftenberg Pneumonia.—What is believed to be the first recorded case of pneumonia in which the etiologic agent was *S. senftenberg* is presented. Clinical and roentgenologic findings unquestionably established the diagnosis of a lobar pneumonia but not until sputum examinations showed the presence of *S. senftenberg* was attention directed toward this unusual causative agent. The organism also was recovered from the patient's stool, and positive agglutinations were found to *S. senftenberg*. Of interest was the presence of a previously damaged kidney which, with the additional strain of a severe infection, gave rise to a marked nitrogenous retention and subsequent abnormal clearances. Clinical and laboratory findings also pointed to the development of a hepatitis. A good therapeutic response was obtained with general supportive measures, despite the marked resistance of the organism to both penicillin and streptomycin.—*Salmonella senftenberg pneumonia: Report of a case, A. Bernstein & L. Perlman, Ann. Int. Med., September, 1951, 35: 721.*—(*T. H. Noehren*)

Paragonomiasis.—Five cases of paragonomiasis, all originating in the island of Leyte, were observed in the Quezon Institute. The reason for admission in each was hemoptysis. This rare condition, also called endemic hemoptysis, is caused by the parasitic fluke *Paragonimus* and is endemic in the southeast Philippine islands of Samar and Leyte. The parasite is introduced into the human gastrointestinal tract in the cystic form by the ingestion of crustaceans which serve as intermediary hosts in the life cycle. After ingestion, the cysts open and the mature flukes invade various organs. The symptomatology varies according to the flukes' localization; particularly frequent are pulmonary lesions with hemoptysis as the most common symptom. There is no accepted method of treatment.—*Observaciones sobre la paragonomiasis en el Instituto Quezon, M. Canizares & J. Celis, Rev. espãn. de tuberc., January, 1951, No. 190: 39.*—(*L. Molnar*)

Chest Findings in Hepatic Amebiasis.—The roentgenologic manifestations of hepatic and chest amebiasis were reviewed in a series of 49 proved cases. Sixteen patients showed roentgenologic evidence of chest involvement; 7 had fluid at the base of the right side of the chest. In 2 patients the left side was involved in addition to the right, and in one the left side only was involved. There were 6 patients with patchy infiltration of the right lower lung field and some fluid; 2 had lung abscesses. In 33 patients, involvement of only the right half of the diaphragm was present. Only 9 patients complained of pain low on the right side of the chest. The first changes to be noted were enlargement of the liver shadow, elevation of the right leaf of the diaphragm, and restriction of its mobility. More advanced involvement of the chest was indicated by obliteration of the costophrenic or cardiophrenic sinuses, pleural effusion, and pneumonic consolidation with or without abscess formation. A localized bulging of the right half of the diaphragm into the right lower lung field denoted a solitary amebic liver abscess. A linear stringlike perpendicular shadow sometimes was seen in the right lower lung field in addition to a fixed and deformed diaphragm. This last finding is suggested as an additional aid in the diagnosis of amebiasis of the chest and is considered worthy of further study.—*The roentgenologic manifestations of amebiasis of the liver with concomitant findings in the chest, S. Schorr & A. Schwartz, Am. J. Roentgenol., October, 1951, 66: 546.*—(*T. H. Noehren*)

Bronchopulmonary Candidosis.—Three cases of bronchopulmonary candidosis responded to iodide therapy. Cultures of the organisms when inoculated into rabbits intravenously proved fatal, and budding forms and pseudomycelia of *C. albicans* were recovered from foci in the liver, lungs, and kidneys. Since the term *Monilia* is now reserved for fungi pathogenic for plants, it is suggested that the term moniliasis as referring to a human disease caused by *C. albicans* be replaced by that of candidosis.—*Bronchopulmonary candidosis (moniliasis), J. E. Morin & S. Leblond, Canad. M.A.J., August, 1951, 65:* 115.—*E. A. Riley*)

Agenesis of Lung.—The world literature contains reports of 85 cases of agenesis of the lung, to which the author adds 2 of his own. These are classified: (*1*) true aplasia, in which there is no trace of lung, bronchus, or vascular supply, (*2*) cases in which there is a tiny outpocketing of the trachea but no lung tissue; and (*3*) cases with a bronchus of small caliber, which ends in a fleshy structure without lobes and which lies within the mediastinum. Numerous malformations in other organs have been noted. Anomalies of the pulmonary vessels were found in all cases in which they were sought. There was no great difference between the incidence on the two sides. Almost 50 per cent of the patients died in the first five years of life. On the other hand, one patient lived to be 72 years of age. Uncomplicated agenesis does not produce symptoms, but many cases are complicated by bronchopulmonary disease and then suffer from dyspnea, wheezing, and cough. The shape and movements of the chest generally are normal. The trachea and heart are displaced to the defective side in which dullness to percussion and absent breath sounds are noted over the lower portions. Marked herniation of the remaining lung may give normal breath sounds over the upper part of the affected side. Radiographically, the heart shadow is found close to the lateral wall of the side of the missing lung. The hypertrophied remaining lung usually protrudes across the midline. On the affected side, the intercostal spaces are narrowed and the diaphragm is raised. A barium swallow reveals displacement of the esophagus to the affected side. Bronchoscopy and bronchography indicate the type of malformation. Atelectasis of the newborn in its early stages is indistinguishable from agenesis; eventually there is gradual aeration of the affected lung. Bronchiectasis with atelectasis may give a similar picture; bronchoscopy and bronchog-

raphy establish the diagnosis.—*Agenesis of the lung, P. Wezels, Thorax, June, 1951, 6: 171.*—*(A. G. Cohen)*

Thymic Enlargement.—Early writers were in error in regard to the size of the normal thymus at different ages, their figures being too low. Diagnosis of an enlarged thymus depends on roentgenographic findings. A condition to be taken into account in the differential diagnosis is mediastinal tuberculosis. The tuberculin test and the presence of certain symptoms, such as cough and fever, will help in differentiation. Among 831 infants under one year of age at Rio de Janeiro, 60 cases of enlarged thymus were found. The rate was definitely higher for boys (8.4 per cent) than for girls (6.0 per cent). Among 396 children aged twelve to eighteen months, the rate was only 2.5 per cent; among 563 children eighteen to twenty-four months old, only 0.36 per cent; and among 959 two-year-old children, 1.2 per cent. The condition should be considered in certain unexplained chest syndromes.—*Sobre o timo, A. de Carvalho, Clín. tisiol., April-June, 1951, 6: 39.*—*(A. A. Moll)*

Bronchial Insufficiency.—The physiologic and pathologic role of active contractions of the smooth muscles of the bronchi and alveoli is poorly understood. Increased tone of these muscles narrows the bronchi and decreases ventilation, causing "bronchial insufficiency." Differences in roentgenographic transparency during inspiration, respiratory displacement of calcified nodules, and shifting of the horizontal interlobar fissure indicate different types of normal ventilation. A cranial, a caudal, or a universal type of ventilation may be observed as the predominant pattern in various regions. As seen tomographically, the pulmonary vessels crowd together at the level of the bifurcation during expiration and remain so throughout the cycle when the respiratory activity of a lobe is reduced. In ventilated areas the pulmonary vessels spread widely during inspiration. It is assumed that in normal quiet breathing some pulmonary segments do not function; during strenuous exertion the entire lung is ventilated. This may explain the phenomenon of "second wind" observed in sports. Stimuli arising in diseased lung tissue may by reflex action increase the tone of bronchial and alveolar muscles, thus increasing the rigidity of a lobe or segment. Mediastinal shift towards the diseased side, as well as elevation and immobility of the diaphragm, may be due to such a prevention of respiratory function in some portion of the lung. The usual patterns of the spread of bronchogenic tuberculosis may be explained by the same mechanism. Spreads are not common in the originally diseased area, where function is absent or reduced; they occur in well-ventilated zones. Some transitory cystic cavities may be due to forceful distension in a less stenotic area when the tone of the broncho-alveolar system is generally increased. Pulmonary emphysema may be regarded as "chronic bronchial insufficiency" resulting from the sequelae of different pathologic processes. Arthritic changes in the upper costo-transversal articulations may hinder expiration and may in part be responsible for the permanently inspiratory position of the chest. Loss of functioning alveolar tissue as a result of repeated pathologic processes, among them chronic bronchitis, may lead to "chronic bronchial insufficiency" with distension of the remaining alveoli. Nervous and psychic factors may intervene in the active contraction of the smooth muscles and so may have a bearing on the treatment of certain pathologic conditions.—*Das Krankheitbild der Bronchial-Insuffizienz, Ein Beitrag zum aktiven Verhalten der Lungen bei der Atmung, K. Heckmann, Fortsch. Roentgenstrahl., January, 1951, 74: 23.*—*(L. Molnar)*

Carbon Dioxide Intoxication in Emphysema.—There has recently developed awareness of a syndrome resulting from the administration of oxygen to patients with pulmonary emphysema and fibrosis. The symptoms are headache, cutaneous vasodilation, stupor, coma, and even death. It is believed that the

mechanism is the removal of the anoxemic stimulus to the respiratory center by the administered oxygen. This results in carbon dioxide intoxication as evidenced by a rise in serum bicarbonate and a fall in serum chlorides. Two cases are reported; in the first, death ensued. In the second, artificial pneumoperitoneum was administered when the patient was almost in extremis. A dramatic recovery resulted.—*Carbon dioxide intoxication in emphysema: Emergency treatment by artificial pneumoperitoneum, J. J. Callaway & V. A. McKusick, New England J. Med., July 5, 1951, 245: 9.*—(*A. G. Cohen*)

Aerosol Cortisone for Bronchial Asthma.—Five patients with bronchial asthma were treated with cortisone by inhalation. Cortisone acetate, 5 mg. in 1 cc. of physiologic saline, was aerosolized every hour for 10 doses daily. Thus, 50 mg. a day were given. No other drugs were used. In 4 of 5 patients, a favorable response was obtained after the fourth day; by the end of the seventh day, almost all signs of bronchospasm had disappeared. Treatment was continued for two weeks. None of the side effects noted in cortisone therapy was seen. In 3 of the 4 cases, relapses occurred. These were controlled by an additional two-week treatment period.—*Administration of cortisone by the aerosol method in the treatment of bronchial asthma, M. L. Gelfand, New England J. Med., August 23, 1951, 245: 293.*—(*A. G. Cohen*)

Tuberculin Therapy of Cerebral Arteriosclerosis.—A preliminary series of 12 cases of primary cerebral arteriosclerosis was successfully treated with Old Tuberculin (OT). At the beginning, 0.1 ml. of a 1:100,000 dilution was injected subfascially in the paravertebral line at the level of the lower scapular angle. Injections were administered two or three times each week. In every case the doses of tuberculin were increased individually. The most effective doses were those causing subfebrile reactions of 37.5° to 38° C. and they were well tolerated. A series of ten to twelve administrations seemed sufficient for satisfactory therapeutic results. Each patient had typical psychic manifestations as well as symptoms of generalized arteriosclerosis with ophthalmic involvement. No patient had a tuberculous infection. All 12 patients showed striking improvement. In one case, the intensity of verbal, auditory hallucinations was audiometrically measured by a deafening test, with a decrease of 10 decibels recorded during the tuberculin-induced subfebrile state. For comparison, treatment with different pyrotherapeutics was applied and was completely unsuccessful.—*Successful treatment of initial cerebral arteriosclerosis by Old Tuberculin, S. Novotny, Lék. listy, July, 1951, 6: 13, 403.*—(*J. Ilavsky*)

Pulmonary Changes in Cardiospasm.—Cardiospasm complicated by basilar pneumonitis was first reported in 1914 by Eisenstein. Since then, lung abscess, bronchiectasis, pleural effusion, atelectasis, and interstitial pulmonary fibrosis have been described in relation to cardiospasm. These changes often are reversible in proportion to the success attained in eliminating the cardiospasm. Pulmonary changes in cases of cardiospasm frequently develop insidiously, unheralded by pulmonary symptoms. Conversely, severe and recurrent pulmonary symptoms may appear in the course of cardiospasm without any recognizable pulmonary roentgenographic changes. A survey was made of all cases of cardiospasm seen at the University of Michigan Hospital during a period of five and one-half years. Only 12 of the 124 cases fulfilled the criteria of associated pulmonary and esophageal disease; in only 5 was there any roentgenographic evidence of pulmonary involvement. The duration of cardiospasm symptoms ranged from one and one-half to thirty years, and in only 3 cases the onset of pulmonary symptoms coincided with the onset of cardiospasm. One patient's symptoms of cardiospasm antedated any pulmonary symptoms by twenty years. It is concluded that all patients with cardiospasm should be considered candidates for the development of

pulmonary complications resulting from esophageal overflow, even in the absence of pulmonary symptoms.—*Pulmonary changes related to cardiospasm, R. A. Lake, Ann. Int. Med., September, 1951, 35: 593.*—(T. *H. Noehren*)

Pulmonary Lesions in Cardiospasm.—The authors review 46 cases of pulmonary lesions associated with cardiospasm in the literature and add 17 of their own, making a total of 63. The proportion in men was 42.9 per cent. In 39.5 per cent, the initial complaint was referable to the pulmonary condition. In the others, complaints referable to the esophagus came either first or simultaneously. The pulmonary lesions resulted from repeated aspiration over a long period. Occasionally, an acute infection resulted from aspiration. Fibrotic or nonspecific infiltration was seen in 28, lung abscess in 8, pneumonia in 8, tuberculosis in 5, bronchiectasis in 4, atelectasis and oil aspiration pneumonia in 3 each, pleural effusion in 2, occlusion of bronchus with asphyxia and pneumothorax in one case each. The right upper lobe was involved twelve times, right lower lobe eight, right middle lobe five, and left upper lobe three times. The predilection for the upper lobes is explained by the fact that aspiration took place chiefly during sleep.—*Pulmonary complications of cardiospasm, A. S. Breakey, C. T. Dotter, & I. Steinberg, New England J. Med., September 20, 1951, 245: 441.*—(*A. G. Cohen*)

Surgical Treatment of Hiatus Hernia.—Congenital sliding hiatus hernias should be treated as early as possible, before esophagitis and shrinkage of the esophagus make reduction difficult or impossible. The acquired sliding hernia does not need treatment when it is small and only causes moderate symptoms. For sliding hernias, the distinction between congenital and acquired forms is easy. In the congenital form, the symptoms begin just after birth, while the acquired type is found most often in persons over forty years old. In para-esophageal hernias, the differentiation is not so easy. The para-esophageal hernia should, if it causes pain, be operated upon because there is danger of incarceration. Most surgeons prefer the thoracic approach. Of 60 patients operated upon, 49 had sliding hernias and 11 had para-esophageal hernias. The operative approach was through a left-sided thoracotomy. There were 2 operative deaths. The results in the para-esophageal type were satisfactory. All of the patients were relieved of pain. Radiologically, there were 4 recurrences among the 9 cases; these were small and all of the sliding type. In the sliding hernias, only 25 per cent were completely cured. At least 50 per cent showed a recurrence. There was no significant difference between the results of the congenital and acquired type. Many of the patients with sliding hernias, though radiologically cured, still have the same complaints as they had before the operation. In analyzing the causes of failure, the authors believe that their technique, although standard, is not satisfactory and modifications are needed.—*Late results in transthoracic herniotomies, T. C. Gertz, J. E. P. M. Regout, & G. Thomsen, Thorax, September, 1951, 6: 316.*—(*A. G. Cohen*)

Pneumoperitoneum After Gastroscopy.—Twelve cases of unintentional pneumoperitoneum have been reported after examination, using the flexible gastroscope with a flexible rubber tip. In one patient, after gastric resection the jejunum was perforated. The present report adds an additional case occurring in a 62-year-old white man. Abdominal laparotomy was performed, but no perforation could be found. There have been 12 patients, including the present one, with pneumoperitoneum following gastroscopy; 7 were explored surgically and in 6, after thorough study, no perforation was found. Five patients were treated conservatively and they recovered without difficulty. This complication is, therefore, benign, as the gastric perforation apparently seals off with-

out difficulty.—*Management of pneumoperitoneum after gastroscopy, R. S. Ylvisaker & J. Myhre, Gastroenterology, July, 1951, 18: 463.*—(*B. Hyde*)

Spontaneous Rupture of the Esophagus.—Spontaneous esophageal rupture is a rare condition, which until recently carried a grave prognosis. The diagnosis often may be made from the history. During an episode of vomiting or retching, sudden exquisite epigastric or substernal pain develops, followed by severe shock. Physical examination may reveal hydrothorax or hydropneumothorax, usually on the left side, emphysema in the neck or chest wall, and a rigid but not tender abdomen. Roentgen examination may be the only means of establishing a diagnosis. The most common roentgen findings are hydrothorax, hydropneumothorax, mediastinal and neck emphysema, and demonstration of a fistula. Only the last 2 are specific.—*Spontaneous rupture of the esophagus, with report of five cases, C. A. Priviteri & B. B. Gay, Jr., Radiology, July, 1951, 57: 48.*—(*W. J. Steininger*)

Chylothorax.—In a case of bilateral chylothorax secondary to Hodgkin's disease, radical surgical correction was carried out by ligation of the thoracic duct with excision of the cisterna. An unusual feature of the case was that aspiration of chyle from the left chest resulted in the disappearance of the fluid from both sides, indicating the presence of a large mediastinal communication.—*Chylothorax, V. D. Schaffner & T. A. Kirkpatrick, Canad. M.A.J., August, 1951, 65: 121.*—(*E. A. Riley*)

Extradural Anesthesia in Thoracic Surgery.—A new method for continuous extradural anesthesia involves insertion of a catheter through the sacral hiatus. The ensuing anesthesia persists during the entire operation more effectively than older methods in any area supplied by the spinal nerves. The procedure has been tried in 65 chest operations, mostly on the parietes, with complete success in 47. Failures were due to anatomical anomalies, dural perforation, hemorrhage, or twisting of the catheter. No immediate or late complications developed in any of the patients. For endothelial surgery, a problem still awaiting solution is how to make patients not under full narcosis tolerate the presence of a tracheal catheter.—*O cateterismo vertebral seletivo, através do hiato sacro, na técnica da anestesia extradural contínua, J. Teixeira, Clín. tisiol., April–June, 1951, 6: 83.*—(*A. A. Moll*)

Diagnosis of Bronchial Carcinoma.—The methods available for the diagnosis of bronchial carcinoma were evaluated by studying 201 cases of suspected malignancy, 163 of which proved to be bronchial carcinoma. The diagnosis was confirmed in 80 cases by histologic examination, in 25 by surgical intervention, in one by cytologic examination, and in 59 by the clinical findings and the clinical course. There were seven times as many men as women in this group. There were 72 cases in the 50- to 59-year age group and 57 in the 40- to 49-year age group. The left lung was as often the tumor site as the right (81:82) but peripheral tumors were twice as frequent in the right lung as in the left (27:14). The routine examination in each case included history, physical examination, chest films in the postero-anterior and lateral positions, fluoroscopy, bronchography, bronchoscopy, and biopsy. Tomography, pneumothorax, and pneumoperitoneum were employed when needed. Cough was present in the history of 70 per cent of the cases; hemoptysis in 41 per cent. In some cases, a partial paresis of the diaphragm due to the involvement of the phrenic nerve was seen fluoroscopically and helped to establish the diagnosis. Bronchography showed bronchostenosis in 82 per cent of the cases as against 51 per cent positive findings with bronchoscopy and 25 per cent with tomography. Bronchography was less useful in the study of peripheral tumors, probably owing to the difficulties in interpreting the findings. The need to differen-

tiate chronic inflammatory or suppurative lung conditions from peripheral carcinoma arose in 40 cases; the malignant nature of the lesion was recognized in 23 of these. Of 41 peripheral tumors there were 15 solitary round foci and 26 cases of diffuse parenchymatous infiltration. Tumors in the periphery of the lung usually offered greater diagnostic difficulties than those located centrally. Except for the cytologic examination of the aspirated bronchial secretion, none of the present methods of investigation allows a really early diagnosis of bronchial carcinoma.—*Erfahrungen bei der Diagnostik des Lungenkrebses, H. Anacker, Fortsch. Roentgenstrahl., January, 1951, 74: 2.*—(*L. Molnar*)

Resection for Bronchogenic Carcinoma.—Up to the end of 1949, 111 pneumonectomies for carcinoma had been done. Very few of these patients are alive. Intrapericardial resection has reduced the incidence of local recurrence, but not of vascular spread. The principle of primary vein ligation, although applied to other parts of the body, has received scant attention in bronchogenic carcinoma. The usual practice has been to tie the pulmonary artery first. After operation, 60 per cent of the patients died with evidence of blood-bone metastases. When compared with unoperated cases, it was found that pneumonectomy reduced the incidence of vascular spread very little, while radiotherapy did not reduce it at all. Pathologic studies showed that vein invasion is common, if not universal, in bronchogenic carcinoma. The author advocates tying the pulmonary veins first as a possible method of reducing the incidence of vascular spread. The previous objections to this procedure are not regarded as valid.—*Avoidable vascular spread in resection for bronchial carcinoma, J. A. Aylwin, Thorax, September, 1951, 6: 250.*—(*A. G. Cohen*)

Mediastinal Bronchogenic Cyst.—Bronchogenic cysts of the mediastinum are rather uncommon, with only 35 cases in medical literature by 1945. In a case at Recife, an exploratory thoracotomy following roentgenographic examination disclosed the true nature of the mass, which was readily removed.—*Cisto bronchogénico do mediastino, J. S. Cavalcanti & H. Menezes, Rev. brasil. med., May, 1951, 8: 328.*—(*A. A. Moll*)

Pulmonary Infarction.—The radiologic findings were reviewed in 120 cases of pulmonary thromboembolism, 85 of which were studied by the author personally. The other cases were either rapidly fatal or the diagnosis was not made until after death or discharge from the hospital. Etiologically, the cases were divided among cardiac (54), postoperative (30), obstetrical (20), and miscellaneous (16) causes. The types of heart disease were rheumatic (45.5 per cent), hypertensive (23 per cent), arteriosclerotic (24.5 per cent), and miscellaneous (7 per cent). Roentgenograms were taken in 94 cases; usually only a single postero-anterior exposure was made, often at the bedside. Abnormalities were seen in 85; shadows representing the infarct were seen in 75. Approximately one-half of the infarcts were in the right lower lobe and one-third in the left lower lobe. Multiple infarcts were seen radiographically in 43 per cent; with added clinical evidence, the figure rose to 52 per cent. In 69 cases, a well-defined area of consolidation was seen; in 13 of these, the shadow was in a costophrenic angle. In only 4 was the so-called classical triangular area of consolidation seen. In 25 there was hazy clouding or streaking at one base. This occurred mostly in the postoperative and obstetrical cases and seldom in the cardiac patients. Sometimes the cloudy area later became one of definite consolidation. Linear shadows were seen only in uncongested lungs. Shadows were often absent during the first twelve hours. The rate of resolution varied from a few days to several months. It was slower in patients with congestion. Among 30 cases with late follow-up, only one showed a persistent scar. During resolution, transient linear scars were often seen. These were of three types: (*1*) pleural, representing thickening of the horizontal fissure; (*2*) horizontal

linear bands; and (*3*) dense bands, the latter two representing atelectasis. Less common findings were abscesses and localized areas of avascularity. Radiographic evidence of pleurisy was present in 48 cases. Effusions were noted in 28, ranging in size from very small to those filling one-half of the hemithorax. The fluid was hemorrhagic in 8 patients. Pleural thickening was seen in 20. Elevation of the diaphragm and restriction of its excursions were noted in 35 per cent. The diagnostic triad for infarction is thus: infarct shadow, pleurisy, and elevation of diaphragm. Pleurisy was found mostly in non-cardiac patients. It was always associated with a lesion in the corresponding lower lobe. In 9 proved cases of infarction, the roentgenograms were normal. The factors concerned in this diagnostic failure were: (*1*) a shadow located behind the heart, (*2*) pulmonary congestion, (*3*) hydrothorax, (*4*) embolism without infarction, (*5*) too early or too late examination, and (*6*) poor technique. If the roentgenogram is negative in the face of strong clinical evidence, the following should be done: (*1*) a repeat roentgenogram, (*2*) a lateral view, (*3*) fluoroscopy, and (*4*) tomography. Conditions that must be differentiated from infarction are: collapse, postoperative pulmonary hypoventilation, linear atelectasis from other causes, subphrenic abscess, lobar pneumonia, and fluid from other causes. In differentiation from collapse: (*1*) 80 per cent of collapse occurs in the first 48 hours after operation, while infarction may occur at any time in the first three weeks; (*2*) cardiac displacement is common in collapse, absent in infarction; (*3*) pleurisy is absent in collapse; (*4*) consolidation develops progressively for a few days in infarction. In postoperative pulmonary hypoventilation, the diaphragm is elevated but there is no pulmonary shadow. In subphrenic abscess, the lung shadow is mottled but it never is in infarction. Lobar pneumonia may involve a whole lobe; the diaphragm is less often elevated. Small pleural effusions bear a similarity to infarct shadows occupying the costophrenic angle. In effusion, the upper border is concave; in infarction, the border is convex and humped. In large effusions, the possibility of underlying infarction must be borne in mind.—*A radiological study of pulmonary infarction, D. S. Short, Quart. J. Med., July, 1951, 20: 233.—(A. G. Cohen)*

Pulmonary Infarction.—Many cases of pulmonary embolism with infarction do not present the typical clinical picture and consequently are misdiagnosed. A total of 4,203 autopsies at the University of Michigan Hospital over the past ten-year period were reviewed, and 104 cases were selected in which embolism with infarction was the immediate cause of death. Only 15 per cent of the cases selected presented the typical clinical picture of hemoptysis, dyspnea, and chest pain. An almost equal number was found to have died with this complication without any really conclusive symptoms or signs. Rapid pulse, rales, mild dyspnea, and reduced blood pressure were common physical signs. Leukocytosis was the most helpful laboratory finding. Roentgenograms usually gave confirmatory or suggestive evidence only. Pulmonary embolism and infarction should always be suspected and carefully searched for in patients who are generally not responding well to treatment. This is of prime importance in elderly bedridden patients, both medical and surgical. Younger patients with rheumatic heart disease and auricular fibrillation are also susceptible to embolism. While venous ligation still holds a place in treatment, the use of anticoagulants, both actively and prophylactically, is much preferred.—*Pulmonary infarction: A frequently missed diagnosis, R. Miller & J. B. Berry, Am. J. M. Sc., August, 1951, 222: 197.—(W. J. Steininger)*

Three-dimensional Roentgenography.—A method has been developed for simultaneously obtaining a set of transverse roentgenographic sections through a part of the body. A rotational method similar to laminagraphy is used to obtain clarity. The sectional details can be transferred to another medium such as transparent gelatin plates which, when

stacked, give a three-dimensional model or "solidogram." The apparatus consists of (*1*) the roentgen tube, (*2*) a Bocky-Potters diaphragm and leads slit between the tube and the patient, (*3*) a horizontal, rotating table (A) on which the patient sits, his axis of rotation being 150 cm. from the tube, and (*4*) another horizontal, rotating table (B) on which are stacked the desired number of roentgenographic films, placed horizontally one atop the other. The rotational axes of the tables are 50 cm. from one another. The two tables rotate synchronously in the same direction and with the same uniform, angular velocity through 360 degrees. The height and position of the tube and the tables is so adjusted that the central beam from the tube inclines downward 15 degrees from the horizontal, passing through the center of the part to be roentgenographed and the center of the stack of films on table (B). Proper positioning of the part can be checked fluoroscopically. During the exposure, tables (A) and (B) are rotated synchronously through 360 degrees so that the corresponding points of the body and of the film stack are always in the same relative position with respect to the beam. All other points in the body pass only momentarily over any particular point in the film stack. It has been demonstrated by geometric optics and by experiments that a true three-dimensional model can be reconstructed from the roentgenograms so obtained.—*Solidography: A method to take a radiogram of the body in three dimensions, S. Takahashi & T. Nikaido, Tohoku J. Exper. Med., June, 1951, 54: 121.*—(*L. B. Hobson*)

ANTIMICROBIAL THERAPY

Pulmonary Tuberculosis and Meningitis.—The mortality among treated cases of tuberculous meningitis was found to be much higher in those in which there was also pulmonary involvement. Persistence of systemic tuberculosis has an unfavorable effect upon the prognosis of the meningitis. Moreover, it is possible to control the meningitis and have the patient die from pulmonary tuberculosis. Also, there may be a fresh metastatic spread of the infection from the lungs to meninges. These cases should therefore be treated by a team consisting of physician, neurologist, and surgeon. The course of treatment proposed is to: (*1*) give streptomycin intramuscularly for a year; (*2*) combine this with several courses of intrathecal injections; (*3*) give *p*-aminosalicylic acid simultaneously; and (*4*) treat systemic foci of active infection whereever practicable. In one case the meningitis was brought under control, but active pulmonary disease persisted. For this a pneumonectomy eventually was done, with good results.—*Treatment of pulmonary tuberculosis complicated by meningitis, H. V. Smith, H. Stevens, & C. G. L. Pile, Lancet, September 8, 1951, 2: 424.*—(*A. G. Cohen*)

Streptomycin for Tuberculous Peritonitis.—A young woman who formerly had pulmonary tuberculosis developed tuberculous peritonitis ten years later. She received 0.5 gm. of streptomycin twice daily for one month. The condition subsided. One year later she went through a pregnancy uneventfully.—*Tuberculous peritonitis treated with streptomycin, H. W. Salmon, Lancet, July 28, 1951, 2: 153.*—(*A. G. Cohen*)

Brief Streptomycin Therapy.—Streptomycin, 1 gm. daily, was given for twenty-one days to each of 121 tuberculous patients. Group I consisted of 41 patients: 16 with pulmonary tuberculosis without cavitation, 23 with cavitation being treated with pneumothorax, and 2 with cavitation for which thoracoplasty had been performed. Group II consisted of 80 patients with pulmonary tuberculosis with a poor prognosis. Extrapulmonary complications were common in both groups. Tubercle bacilli disappeared from the gastric aspirates of 7 patients in Group I. Both urine and sputum cultures became negative in one patient with complicating renal tuberculosis in Group II; two cultures from another patient with tuberculous laryngitis were negative. Of the 121 patients, 57

continued to produce streptomycin-sensitive bacilli; 30 had only a few resistant strains among more sensitive ones. Another 30 produced moderately resistant bacilli. In Group I, all of the 16 patients without cavities became asymptomatic and showed roentgenographic improvement, although only one lesion disappeared. Two patients relapsed two and seven months, respectively, after treatment. Of 6 patients with laryngitis, 5 were apparently cured; one still had a small ulceration several months later. Bronchial lesions completely cicatrized in one patient, and atelectasis disappeared; in 3 others the lesions persisted, and 5 still had atelectasis after treatment. In 4 patients, the bronchial lesions accompanied cavitation and the treatment was successful; in 3 others no improvement was noted. Cavities had become larger during pneumothorax in 7 patients. During treatment two cavities rapidly closed, one temporarily grew smaller, and four were unchanged. Pleuritic effusion during pneumothorax failed to improve, but parietal fistulas after thoracoplasty did improve. Tuberculous laryngitis was the chief complication in 31 patients of Group II; the larynx became almost normal in 21, improved considerably in 9 others, and was unchanged in the other although pain and dysphagia disappeared. Only 7 of these patients received long-term benefit. The risk of the development of streptomycin-resistant bacilli makes it hazardous to use this short course of streptomycin therapy.—*Essai de traitement de la tuberculose pulmonaire par la streptomycine basé sur la réduction de la durée de la cure, A. Reginster, Acta tuberc. belg., August, 1951, 42: 309.*—(*A. T. Laird*)

Intolerance to PAS.—Among tuberculosis patients treated with *p*-aminosalicylic acid (PAS) 4 developed unfavorable reactions. In 3, streptomycin therapy had preceded PAS. Two patients showed nephritis and 2 skin eruptions, in one with fever. One of the patients with renal symptoms died from miliary tuberculosis, and the autopsy revealed normal kidneys. A direct toxic effect of the drug was thus unlikely but not an allergic action. Following discontinuance of the drug, the symptoms subsided. In one case, renewal of the medication brought about a recurrence of the skin manifestations.—*Accidentes de intolerancia al PAS, A. P. Heudtlass & J. A. Schicht, Clin. tisiol., April-June, 1951, 6: 75.*—(*A. A. Moll*)

Solvoteben for Tuberculosis.—Solvoteben is a comparatively new, water-soluble thiosemicarbazone supplied in 10 and 20 per cent aqueous solution. It is recommended for local use in tuberculous meningitis, fistulas and abscesses, joint involvement, and empyema. Inhalations and intracavitary applications have been disappointing. In a case of tuberculous infection of the extrapleural space, injections with Solvoteben gave an excellent result. The chief complications are renal and hepatic irritation and skin rash. These subside upon discontinuance of the drug.—*Solvoteben—a water-soluble thiosemicarbazone, H. Roche, Tubercle, August, 1951, 32: 170.*—(*A. G. Cohen*)

Therapy of Friedländer Pneumonia.—During a one-year period from July 1949 to July 1950, 11 patients with Friedländer's pneumonia were treated at the King County Hospital; 9 were males, 8 were chronic alcoholics. In one patient, symptoms appeared immediately following a nine-day course of penicillin therapy for syphilis. Six of the 11 patients died; 4 had overwhelming infections and died within sixteen hours despite intensive chemotherapy. In one patient death was due to lower nephron nephrosis. The sixth patient had a mixed infection, and death was probably due to Friedländer's bacillus empyema. Four of the patients who died had positive blood cultures, while only one of the patients who survived was bacteremic. Of the 5 patients who survived, 2 responded well to chloramphenicol and the others received various combinations of streptomycin, sulfadiazine, aureomycin, penicillin, and chloramphenicol. In one patient whose pneumonia was complicated by a bronchopleural fistula and empyema,

there was little improvement on aureomycin therapy plus repeated aspirations. Following open drainage the infection responded promptly to streptomycin and sulfadiazine. In 3 patients there was residual scarring and fibrosis following recovery from the acute illness. Because of the generally poor physical condition of individuals who contract Friedländer pneumonia and the frequent delay in starting therapy, it is probable that the mortality rate from this disease will remain high. However, in the patients who were in relatively good physical condition and in whom treatment was started early, the response to chemotherapy was remarkably good. On the basis of *in vitro* sensitivity tests and the clinical response observed in the present series of patients, it would appear that aureomycin and chloramphenicol are probably as effective as streptomycin in the therapy of Friedländer's pneumonia (Authors' summary). —*Antibiotic therapy of Friedländer pneumonia, W. M. M. Kirby & D. H. Coleman, Am. J. Med., August, 1951, 11: 179.*—(*T. H. Noehren*)

Blood Concentration of PAS.—Any technique for determining blood levels of *p*-aminosalicylic acid (PAS) has to take into account its great instability, which explains the discordant results of several authors. A series of patients received 15 gm. of PAS as the calcium or sodium salt in six divided doses. Blood was taken for analysis after three doses. Blood levels fell more rapidly after the intake of the sodium than after the calcium salt. Blood levels depended less on the total daily dose than on the size of the single dose and on the time blood was taken. It was observed that the addition of small doses of calcium PAS to the usual sodium PAS considerably increased the blood levels of PAS.—*Études sur la PAS hémie, P. Zivy & A. Touchard, Presse méd., June 16, 1951: 852.*—(*V. Leites*)

Aureomycin for Psittacosis.—An epidemic of psittacosis, observed in Dortmund in January, 1950, consisted of 6 cases in two families and 2 other isolated cases. The clinical course of the disease was usually severe; one patient died. The psittacosis virus could not be recovered from the sputum and blood but was demonstrated in the tissues of the deceased patient. The complement fixation reaction for psittacosis was intensively positive in 4 cases and doubtful in 3 cases. Penicillin, streptomycin, and other drugs showed no therapeutic effects. Aureomycin, 500 mg. orally every four hours in 3 patients whose clinical course was still active, was followed by defervescence and symptomatic improvement within twenty-four hours. —*Uber Psittakosis und ihre Behandlung mit Aureomycin, (Neue Erfahrungen bei einer kleinen Epidemie), H. Hamke, Deutsche med. Wchnschr., February 23, 1951, No. 8: 246.*—(*L. Molnar*)

LABORATORY STUDIES

New Human Mycobacterium.—A benign, chronic, papulo-ulcerative disease, especially localized on the elbows, has been observed in 70 patients at Örebro, Sweden. Tuberculoid granulomas were found in most of the 30 cases examined histologically, and in one lesion acid-fast bacilli were seen. Of 20 lesions examined bacteriologically, 3 yielded large, yellowish-white colonies of acid-fast, gram-positive bacilli when grown on Löwenstein medium with glycerin at 31°C. but not at 37°C. The bacilli were resistant to *p*-aminosalicyclic acid and were of low-grade pathogenicity to guinea pigs, rabbits, and rats. Mice were more susceptible. Heat-killed bacilli produced tuberculin-like reactions with tuberculoid granulations when injected intradermally in 3 tuberculin-positive human volunteers. These *Mycobacteria* were also recovered from the walls of a swimming pool used by some of the patients two to three weeks before the lesions appeared. The newly found organisms differ from the *Mycobacterium ulcerans* found by MacCallum *et al.* in human skin lesions in Australia.—*A new type of pathogenic Mycobacterium (Letter), A. Norden & F. Linell, Nature, November 10, 1951, 168: 826.*—(*L. B. Hobson*)

Virulence of Tubercle Bacilli.—A standard of virulence for human tubercle bacilli is described in terms of the responses obtained in mice infected intracerebrally with *M. tuberculosis* H37Rv. This standard provides a reference against which the relative virulence of other strains of tubercle bacilli may be tested and expressed quantitatively as their virulence ratio. Of 17 strains of tubercle bacilli recently isolated from sputum, 11 were comparable to the standard both in response-dose relationship and in the character of the lesions induced in mice. Of 20 strains isolated from other sources than sputum, 13 were subvirulent. The degree of virulence shown by recently isolated organisms may or may not be stable. With unstable strains, decrease in virulence may result from storage or subculture and increase in virulence may result from animal passage. It is possible that a long sojourn in certain tissues of a resistant host can diminish virulence and that, in general, virulence may be modified in a given host by variations in response to inocula below a certain threshold. No correlation was evident between the clinical severity or household spread of tuberculosis and the virulence of the bacilli on isolation. Even avirulent tubercle bacilli are to some extent infective to mice and other animals.—*Virulence of human tubercle bacilli, G. T. Stewart, Lancet, September 20, 1951, 2: 562.*—(*A. G. Cohen*)

Resistance of M. Tuberculosis to Electrolytic Silver.—The action of electrolytic silver was studied, using *M. tuberculosis* and saprophytic *Mycobacteria*. Following a ten minute exposure, this agent demonstrated a strong and rapid effect on several bacterial species, including *E. coli*, *Micrococcus pyogenes* var. *aureus*, *Sarcina lutea*, *B. subtilis*, *Ps. aeruginosa*, and *Streptococcus* sp. On the other hand, *M. tuberculosis* proved resistant, even following 60 minutes' contact. However, after a twenty-four hour exposure, the number of cultures decreased, as compared to the controls. Nonpathogenic *Mycobacteria* failed to show a similar resistance. This suggests the possibility of using the bacteriolytic properties of silver to differentiate tubercle bacilli from nonpathogenic acid-fast organisms.—*Resistência do "Mycobacterium tuberculosis à ação oligodinâmica da prata, M. B. Lobo & Julia V. Vasconcelos, Rev. brasil. tuberc., November–December, 1950, 18: 647.*—(*A. A. Moll*)

Intrathecal Tuberculin for Tuberculous Meningitis.—Tuberculin (PPD) was administered intrathecally to 5 adult patients with tuberculous meningitis who were responding poorly to standard therapy of intramuscular and intrathecal streptomycin with oral *p*-aminosalicylic acid. Clinically, there was evidence that tuberculin administration actually increased the degree of cerebrospinal fluid block. *In vivo* experiments after PPD administration failed to show the presence of either plasmin or of an activator for plasminogen. In *in vitro* experiments, PPD failed to activate plasminogen. It was concluded that any possible benefit of intrathecal tuberculin is not derived from the specific lysis of fibrous exudate.—*Intrathecal tuberculin in tuberculous meningitis, A. P. Fletcher, Lancet, August 18, 1951, 2: 290.*—(*A. G. Cohen*)

Methylene Blue Standardization of BCG.—A new method is suggested for standardizing BCG, based on the ability of the vaccine to reduce methylene blue. A BCG unit is defined as the amount of vaccine reducing 50 γ of methylene blue in six minutes. With 10-day-old cultures, this unit represents 50 mg. of BCG. Where parenteric BCG is used, a micro-unit, 1,000 times smaller, could be used. The method measures only the quantity of live organisms present. While in the tenth day of growth, 50 mg. of organisms yield one unit; by the twenty-fifth day, 720 mg. are required. Of these 720 mg., approximately 93 per cent are dead germs.—*Padronização do B. C. G., D. M. Cardoso & W. F. Almeida, Rev. bras. tuberc., November–December, 1950, 18: 633.*—(*A. A. Moll*)

Reaction of Asthmatic Bronchial Tissue.—Experiments were performed on lung and bronchial tissue obtained by resection for bronchiectasis in a boy who was also an asthmatic. Tests on the boy had indicated sensitivity to pollens and dust. Isolated bronchial rings contracted vigorously when placed in contact for the first time with a dilute solution of mixed pollens. A second dose failed to elicit the response, but exposure to another antigen caused contraction. Antihistaminic drugs diminished the contraction when used in very high concentrations, probably beyond the tolerable clinical range. Lung and bronchial tissue from the asthma case released histamine when brought in contact with a specific antigen. Tissue from a nonasthmatic did not produce histamine and did not contract.—*Reaction of isolated human asthmatic lung and bronchial tissue to a specific antigen, H. O. Schild, D. F. Hawkins, J. L. Mongar, & H. Herzheimer, Lancet, September 1, 1951, 2: 376.*—*(A. G. Cohen)*

Bronchial Arteries in Bronchiectasis.—Neoprene casts of the bronchovascular system were made after experimental ligation of the pulmonary artery in dogs. One year after ligation, the following changes had taken place: (*1*) There was hypertrophy of the bronchial arteries; they became large, dilated, and extremely tortuous vessels approximately ten times their previous size. (*2*) The pulmonary artery decreased in size but remained patent distal to the ligature. (*3*) Visible communications appeared between branches of the bronchial and pulmonary arteries. These communications were found at the base of the lobular artery. The changes in a human case of bronchiectasis were identical, but the bronchial vessels and anastamoses were both larger. This is regarded as evidence of increased resistance in the pulmonary artery.—*A comparison of the role of the bronchial arteries in bronchiectasis and in experimental ligation of the pulmonary artery, F. B. Cockett & C. C. N. Vass, Thorax, September, 1951, 6: 268.*—*(A. G. Cohen)*

Spirography.—It was demonstrated that, even though a spirometer may be accurate under static conditions, it may give grossly inaccurate records at higher rates of respiration. At least two factors are concerned: (*1*) the inertia of its moving parts, and (*2*) the resonance in the water column in the water jackets. It is not practicable to draw a calibration curve for a spirometer so that the recording errors may be corrected. Greatly improved response curves were obtained with the lightweight celluloid bell. This suggests that the moving parts should be kept as light as possible in spirometers used at high rates of breathing.—*The accuracy of spirographic recording at high respiratory rates, L. Bernstein & D. Mendel, Thorax, September, 1951, 6: 297.*—*(A. G. Cohen)*

Glucose Values in Pleural Effusions.—The content of free sugar was determined in 25 specimens of pleural fluid and the results correlated with the cause of the patient's condition. All of the 15 effusions of proved tuberculous etiology showed glucose levels below 40 mg. per 100 ml. On the other hand, pleural fluids caused by nontuberculous conditions, such as cancer or pneumonia, gave glucose values paralleling the blood levels. In 6 of 7 cases of empyema, glucose levels were also very low. This, however, had no relation to the nature of the effusion. The results suggest the value of routine quantitative determinations of sugar in all pleural fluid specimens.—*Determinación cuantitativa de la glucosa en los líquidos pleurales: Su significación clínica en relación a la naturaleza tuberculosa del derrame, J. A. Valero Martínez, Rev. Policlín. Caracas, May-June, 1951, 19: 195.*—*(A. A. Moll)*

PUBLIC HEALTH AND EPIDEMIOLOGY

Killed Tubercle Bacilli for Vaccination.—Human tubercle bacilli were grown on Sauton medium, washed, and formolized. After 8 days' incubation at 40°C. the solution was placed in a water bath at 60°C. for half an

hour and then stored at 4°C. until use. Culture and guinea pig tests demonstrated that the bacilli so treated had become nonviable and avirulent. Twelve tuberculin-negative cattle were divided into 4 groups of 3 each. Group I received 0.5 gm., wet weight, of the avirulent bacilli suspended in 20 cc. of physiological saline. Group II was given 0.5 gm. of the bacilli in 20 cc. of a "retarding" medium of gelatin and pectin such as is employed in penicillin therapy. Group III received 0.5 gm. of bacilli in 20 cc. of a mixture of two parts of saline to five parts of aluminum hydroxide gel. Group IV was inoculated in the usual manner with freshly prepared BCG. All injections were subcutaneous. In the following days, local reactions appeared in all animals, varying from a small nodule to one the size of a fist. Two weeks after inoculation the animals were tuberculin tested. Those in Groups I and II were negative. The reactions in those receiving avirulent organisms with aluminum hydroxide (Group III) were positive and comparable to the BCG-treated animals (Group IV). It appears that aluminum hydroxide gel is not only an excellent adjuvant in immunity production, as demonstrated with other vaccines, but also strongly stimulates allergy production by avirulent tubercle bacilli. The question is raised as to whether immunity stimulation runs parallel to allergy stimulation. Experiments are underway to test this and also to test the effects of varying dosages, proportions, and routes of injection.—*Immunologie: Allergie à la tuberculine provoquée chez les animaux de l'espèce bovine, par l'injection de bacilles tuberculeux rendus anavirulents par l'action du formol et de la chaleur et mis en suspension dans l'hydroxyde d'aluminum, Ramon, G., Debré, R., Richou, R., Costil, L., Thierry, J. P., Gerbeaux, C., Compt. rend. Acad. d. Sc., September 5, 1951, 233: 506.*—(*F. J. Lansdown*)

BCG vs. Killed Human Tubercle Bacilli.—Ramon has objected to the use of BCG and suggested the substitution of killed tubercle bacilli as a vaccine. His ideas may be questioned. (*1*) Failure to obtain better immunity in rabbits and guinea pigs with BCG than in cows with killed tubercle bacilli is explained by the great difficulty in immunizing the two rodent species. Maragliano was unable to immunize them with heat-killed tubercle bacilli. (*2*) Suspensions of dead bacilli in paraffin or vasoline produce prohibitively serious lesions. (*3*) The stability of the avirulence of BCG has been repeatedly confirmed and the author has grown two other attenuated bovine strains since 1937 without reversion to virulence. Another of his strains reverted on two occasions after animal transfers. (*4*) Variations in the incidence of adenopathy after BCG seem less than Ramon believes and may be due to differing techniques of vaccination or to varying host susceptibility. (*5*) The brief viability of BCG is of no consequence in metropolitan centers where it can be harvested and used within twenty-four hours. Frozen-dried BCG prepared at the Pasteur Institute is as effective as fresh vaccine although other laboratories have been unable to duplicate the preparation. (*6*) The finding by Dubos that BCG vaccines contain less than 1 per cent living bacilli is refuted by others and may be due to the adverse effects of Tween 80 in Dubos medium. (*7*) A Swiss study quoted by Ramon found no abnormal tubercle bacilli in the Pasteur Institute's frozen-dried vaccine although these bacilli had been finely divided by the steel ball method before freezing. (*8*) A difference in the size of BCG between Danish and French preparations is due to the former's use of Sauton's medium and is not evidence of a variation in virulence as suggested by Jensen and Holm. Sauton's medium is less satisfactory than potato medium of Calmette and Guerin for growing BCG. Of special interest are Hyge's report on Danish school girls, Heimbeck's study of student nurses, Andersen and Belfrage's review of the Swedish mass vaccination program, Aronson and Palmer's work among American Indians, Ferguson's results with Canadian student nurses, and Dahlstrom and Dip's report on Swedish

soldiers. (*9*) Although tuberculin allergy and resistance to tuberculosis may not be causally related, allergy is an evidence of resistance as demonstrated by a variety of epidemiological studies. All valid statistical studies have shown that the mortality from tuberculosis is reduced by 80 per cent as the result of BCG vaccination with the development of allergy. (*10*) The inferior results achieved with BCG as compared with diphtheria and other immunizing agents is attributable to the differences between tuberculosis and the more acute diseases. (*11*) The American Trudeau Society's recommendation that BCG be used only for exposed groups can be construed as affirmation of its usefulness. The large-scale studies of the United States Public Health Service are part of the American trend toward re-evaluating all scientific problems considered as solved in the Old World.—*Considerations sur la valeur de la vaccination antituberculeuse par le BCG, F. Van Deinse, Ann. Inst. Pasteur, August, 1951, 81: 126.*—(*V. Leites*)

Tuberculosis Control in Brazil.—Since 1900, the tuberculosis death rate at Rio de Janeiro has shown increase and decrease but, on the whole, a decreasing trend. From 500 per 100,000, it dropped to 402 in 1910, 399 in 1920, 323 in 1930. The curve stabilized between 1926 and 1936, when a new rise developed and continued to 1945. In 1945 the rate was 342 per 100,000. From then on a marked decline occurred. By 1949 the rate was down to 242 per 100,000; in 1950 it was only 168 per 100,000. Hospital care of patients, economic and social conditions had little to do with the decrease as they showed hardly any change during the period in question. The significant factor was early detection and treatment of cases on a large scale as a result of mass chest surveys. That BCG did not influence the trend may be inferred from the fact that, in 1949, 62 per cent of the 50,138 newborn children in Rio de Janeiro were vaccinated with BCG. Yet the tuberculosis death rate in infants under one year did not decrease but, on the contrary, increased over the year before. This had also been the case for the previous three years. A similar phenomenon occurred in the one-year and two-year age groups. This trend was reversed in the three-year and four-year age groups. New drugs such as streptomycin and PAS must also be credited with a share in the improved situation.—*Reparos do Dr. Arlindo de Assis ao meu trabalho "Diagnostic et Traitement Precoces, Facteurs Décisifs dans la Prophylaxie de la Tuberculose", M. de Abreu, Clín. tisiol., January-March, 1951, 6: 33.*—(*A. A. Moll*)

Oral BCG Vaccination.—Five different methods were used in vaccinating orally with BCG 1,460 newborn and 64 older children at São Paulo. Of the total, (*1*) 491 infants up to ten days of age received three 0.03 gm. doses every other day; (*2*) 271 infants up to fifteen days of age, a single 0.10 gm. dose; (*3*) 65 children ten days to thirty-four months old, daily increasing (0.02 to 0.10 gm.) doses, totaling 1.19 gm. in twenty-eight days; (*4*) 117 newborn, semi-monthly 0.10 gm. doses, totaling 0.60 gm. in seventy-five days; and (*5*) 580 newborn, monthly 0.10 gm. doses, totaling 0.60 gm. in five months. Only the third group was lodged in an institution; the others lived with tuberculosis-free families. Tuberculin positiveness rose in group (*1*) to 66 per cent in the sixteenth week, dropping to 25.4 by the thirty-sixth month; rose in group (*2*) to 87.7 per cent in the sixteenth week, dropping to 21.4 by the twenty-fourth month; varied in group (*3*) from 67.18 per cent in the eighth week to 11.29 per cent in the twelfth month; fell in group (*4*) from 50 per cent in the sixth week to 4.54 by the twelfth month; and dropped in group (*5*) from 55.8 per cent in the fourth week to 3.45 per cent at the thirty-sixth month. Thus, methods (*1*) and (*2*) developed the highest and most persistent allergic rates. On the other hand, methods (*4*) and (*5*) gave superior protection, no case of tuberculosis morbidity or mortality occurring in these two groups nor among 189 newborns living in tuberculosis-infected environments and vaccinated similarly. The degree of immunity may be in-

versely proportional to the allergy developed, and the protection index should not be measured by the tuberculin sensitivity.—*Evolução da alergia segundo os esquemas da orovacinação, J. Rosemberg, J. N. Aun, & B. Macarron, Clín. tisiol., April-June, 1951, 6: 17.*—(*A. A. Moll*)

Tuberculin Sensitivity.—During a period of four and one-half years, 1,499 hospitalized Scottish children between the ages of six months and twelve years received tuberculin tests. Both the jelly and the Mantoux (1:1,000 OT) tests were used. The proportion of children with positive reactions was higher in country dwellers than in city dwellers. The difference occurred mainly in the first six years; it is most likely related to the difference in the extent of use of unpasteurized milk. On the other hand, the incidence of active tuberculosis was higher in the city children. Infections occurring in this group, being airborne, were mostly intrathoracic. One of 3 city children and almost one of 4 country children with positive tuberculin tests showed evidence of active tuberculosis. Fifty-six per cent of city and 40 per cent of country children below the age of six years with positive reactions showed active tuberculosis. The two types of test gave identical results in 96.06 per cent of the series. For practical purposes they may be regarded as equivalent. The jelly test is therefore preferred because of its relative simplicity.—*Tuberculin sensitivity of children in Northeast Scotland, N. S. Clark, Lancet, September 15, 1951, 2: 464.*—(*A. G. Cohen*)

Tuberculin Test.—The necessity for tuberculin testing with graded strengths before and after BCG inoculation entails too many visits to the clinic. To eliminate this, a multiple-puncture test was devised. The apparatus consists of six needles arranged in a circle 6 mm. in diameter; the needles are released simultaneously and puncture the skin to an even depth of 1 to 2 mm. Tuberculin is previously spread over the skin. The test is read in forty-eight to seventy-two hours. In a positive case, at twenty-four hours 6 small papules are seen; at thirty-six hours, these have coalesced resulting in a ring of induration; at forty-eight hours, there is a solid indurated area. In a negative case, no induration results. A total of 1,043 tests were made. There was a fairly good correlation with the intradermal test, using 100 units of tuberculin. Further study is required to determine the value in relation to the Mantoux test. It is hoped that a single multiple-puncture test will suffice.—*The multiple-puncture tuberculin test, F. Heaf, Lancet, July 28, 1951, 2: 151.*—(*A. G. Cohen*)

Tuberculosis in Dockers.—Several thousand dockers are employed in the port of Hull. Among these are men who are called "grain-workers"; they handle mostly grain, seeds, and chemical substances. An unusual degree of exposure to dust is provided. During a ten-year period, 192 symptomatic grain-workers were seen at the chest clinic. Of these, pulmonary tuberculosis was found in 75, pneumoconiosis in 31, and carcinoma in 6. Of the 75 tuberculosis cases, 54 showed sputum positive for tubercle bacilli on first examination. The true incidence of the disease among grain-workers cannot be stated since routine chest examinations were not made. There is no doubt, however, that the incidence is exceptionally high. The social and economic status of these men is equivalent to that of workers in other fields and cannot be regarded as a factor. It is believed that the high incidence is related to work conditions.—*Pulmonary tuberculosis in dockers (grain-workers), L. Dunner & R. Hardy, Tubercle, August, 1951, 32: 164.*—(*A. G. Cohen*)

Tuberculosis in School Personnel.—In 1949, 2,059 school teachers and attendants were roentgenographically examined at Belo Horizonte, Brazil. Among the 1,771 teachers, 10 cases (0.56 per cent) of active tuberculosis were found. In 15, a residual tuberculosis was present, 5 of them having been under treatment previously. Among the 288 janitors and helpers, one case (0.35 per cent) of active

tuberculosis was found. Among 45 roentgenographically suspicious cases, in 5 the cause was found to be a calcified first cartilage. A comparison of Abreu's method and the 12 by 16 cm. films demonstrated the reliability of the former technique for survey purposes. One should not depend on it, however, for qualitative diagnosis.—*Cadastro torácico do professorado em Belo Horizonte, A. de Oliveira Lucena, Rev. bras. tuberc., September-October, 1950, 18: 547.*—(*A. A. Moll*)

Pregnancy and Tuberculosis.—A total of 59 cases of pregnancy in tuberculous patients was seen at the Oswaldo Cruz Maternity Hospital, Rio de Janeiro, from May 1949 to November 1950. The follow-up period extended to eighteen months. Eleven cases of residual tuberculosis showed no change in condition as a result of pregnancy and labor. Of 48 active cases, 2 patients have since recovered, 14 improved, 14 are arrested, 5 progressed unfavorably, and 13 died. Practically all deaths occurred in patients with far advanced, fibrocaseous disease. In the group as a whole, labor was relatively painless although longer than in normal cases. No puerperal complications developed. Babies were immediately removed from their mothers. Pneumoperitoneum was used routinely in these patients. Streptomycin therapy also became a routine measure from the onset of labor.—*Influência da gravidez na tuberculose pulmonar, L. R. L. de Gouvêa, J. Menezes, & M. A. Sayeg, Clín. tisiol., January-March, 1951, 6: 47.*—(*A. A. Moll*)

Pulmonary Blastomycosis in Brazil.—In a case of South American blastomycosis with pulmonary localization, a presumptive diagnosis of pulmonary tuberculosis had been made. Necropsy findings clarified the situation and removed all possibility of a concomitant tuberculous condition. Sputum and roentgenographic examinations are valuable in the differential diagnosis, but the roentgenographic picture is often misleading. Brazilian statistics show a high incidence (84 per cent in some series) of lung involvement in South American blastomycosis. These figures mostly represent post-mortem findings as secondary manifestations of the disease elsewhere in the body. Primary cases are uncommon. Recent development of mass chest surveys may change the situation by bringing about earlier recognition of the disease. This is important in a country where the condition is highly prevalent.—*Localização pulmonar da doença de Lutz, R. Fernandes & W. Mendes, Clín. tisiol., April-June, 1951, 6: 107.*—(*A. A. Moll*)

Lung Cancer in Chromate Workers.—There are 7 chromate plants in the United States. The environment of each occupation within these plants is contaminated with trivalent (Cr^{+++}) and hexavalent (Cr^{++++++}) chromium. Most employees are exposed to Cr^{+++} at concentrations in the air ranging from 0.06 mg. per cubic meter for office workers to 1.0 mg. for certain production and maintenance employees. The personnel is exposed to three types of compounds: (*1*) insoluble crude ore chromite which contains Cr^{+++}, (*2*) an interim product, soluble sodium monochromate, containing Cr^{++++++} and (*3*) the finished product, soluble sodium dichromate, containing Cr^{++++++}. In the surrounding county, 1.2 per cent of all deaths resulted from respiratory cancer. Among workers at the chromate plant, the incidence was 17.0 per cent. There is evidence that insoluble chromium compounds such as chromite dust and chromic oxides are stored in the lung. They form a reservoir from which chromium is gradually released for many years, even after cessation of exposure.—*Occupational cancer and other health hazards in a chromate plant. A medical appraisal: 1. Lung cancers in chromate workers, T. F. Mancuso & W. C. Hueper, Indust. Med. & Surg., August, 1951, 20: 358.*—(*A. G. Cohen*)

THE AMERICAN REVIEW OF TUBERCULOSIS ABSTRACTS

Edited by LAWRENCE B. HOBSON

VOLUME 65 APRIL, 1952 ABST. NO. 4

CLINICAL STUDIES, TUBERCULOSIS

Perforation of Nodes into Bronchi.—In aged white persons, reactivation of a quiescent tuberculous mediastinal lymphadenitis may result in gradual perforation of the nodes into large bronchi. In most instances the process is relatively benign so that healing with stricture formation has already occurred by the time the patients are first seen. Occasionally, progressive bronchial and, later, pulmonary tuberculosis develop. The bronchus of the right middle lobe is particularly vulnerable to this process because of its position in relation to chains of nodes and because of its small caliber. Atelectasis of the lobe results. In a series of 8 patients with atelectasis of the middle lobe secondary to perforation of lymph nodes into bronchi, all but one were 60 years of age or older and all were women. All were diagnosed during life, but none was being treated for tuberculosis when first seen in a general hospital. The chief symptoms, cough, expectoration, and sometimes wheezing, are those of bronchial irritation and obstruction. These symptoms usually are not severe. If perforation by a calcified spicule (broncholithiasis) occurs, hemoptysis may be profuse. In 2 cases, tubercle bacilli were found in the sputum, indicating an active infection; one patient died and the other recovered. In the other 6 cases, no evidence of active infection appeared. Some patients are alive and relatively well as long as eleven years after the diagnosis was made. The roentgenographic features of middle lobe atelectasis were present. The inadequacy of the postero-anterior view, the greater value of the lateral view, and the usefulness of the postero-anterior lordotic view are important and laminagraphy is potentially valuable. In such cases, calcifications at the hilus of the right lung are highly suggestive of a tuberculous etiology. These shadows, when obscure in conventional exposures, often may be demonstrated by special methods. A tuberculous etiology also is indicated by the presence of tubercle bacilli in the sputum or the expectoration of broncholiths. Bronchoscopic examination may reveal specific tuberculous lesions such as ulcers, granulation tissue, or protruding nodes. Most often, however, there is found a marked narrowing of the orifice of the middle lobe bronchus by scar tissue, forming a stricture or bulge. The presence of anthracotic pigment in the vicinity of the scar is regarded as evidence of previous lymph node perforation. The other important bronchial diseases, particularly carcinoma cause isolated middle lobe atelectasis much less frequently than does perforation by tuberculous lymph nodes; therefore, this condition should be suspected above all others. The treatment, in cases of active infection, should be institutional care supplemented by specific measures. Treatment, in cases of healed strictures, should be symptomatic and conservative unless suppuration or severe hemorrhage occurs (Author's summary).—*Atelectasis of the right middle lobe resulting from perforation of tuberculous lymph nodes into bronchi in adults, A. G. Cohen, Ann. Int. Med., October, 1951, 35: 820.*—(*T. H. Noehren*)

Bronchiectasis in Pulmonary Tuberculosis.—Evidence of bronchiectasis was sought in 280 patients with pulmonary tuberculosis, the usual bronchographic technique being used in 100 instances. The other 180 patients had had Monaldi drainage, and the bronchial tree was explored through the drain. No conclusions as to incidence could be drawn, since less than one in 100 patients was considered eligible for lipiodol instillation. Dilatation of the entire bronchial tree on one side was observed in cases of: (*1*) multicavitary destructive tuberculosis of the entire lung; (*2*) fibrothorax fol-

lowing involvement of a whole lung, stenosis of the main bronchus, or chronic pleurisy; and (*3*) prolonged pulmonary collapse. Cases belonging to groups (*2*) and (*3*) were usually asymptomatic. Bronchiectasis was found throughout a lobe in lobar consolidation, with or without cavitation; and lobar consolidation with excavation was usually accompanied by bronchiectasis. The dilated cylindrical bronchi terminated in small spherical cavities producing the appearance of "honeycombing," the walls of the dilated bronchi were tuberculous, and the response to collapse therapy was usually poor. Resection seemed the treatment of choice in these cases. Involvement of one or more pulmonary segments was the most frequent distribution, and the dilatations were usually cylindrical. The apical and posterior segments were most often involved, paralleling the predilection of tuberculous lesions. Involvement of middle lobar and lingular bronchi, so frequent in simple bronchiectasis, was unusual in pulmonary tuberculosis. It was difficult to separate the symptoms due to bronchiectasis from those due to the tuberculous process itself. Such bronchiectasis was frequent in fibrous, contracted upper lobes which healed slowly with or without collapse therapy; the prognosis was little altered by the bronchiectasis, and there was no evidence of a higher relapse rate. Among the 180 patients treated with Monaldi drainage, tuberculous bronchiectasis of the draining bronchus was a frequent occurrence. Bronchiectasis representing the inactive and asymptomatic sequela of a fibrosing tuberculous process was no indication for surgery, despite an impressive appearance in the bronchogram.—*Rapport entre les bronchiectasies et les lésions pulmonaries de la tuberculose tertiaire, F. Magnin, J. Le Tacon, Hanish, & Ferroldi, Rev. de la tuberc., 1951, 15: 245.*—(*V. Leites*)

Pulmonary Stenosis and Tuberculosis.—A case of fatal pulmonary tuberculosis was observed in a patient with congenital stenosis of the pulmonary artery confirmed by autopsy. The lumen of the pulmonary artery was one-third that of the aorta, and the right ventricle showed considerable hypertrophy. A successively bilateral pneumothorax was apparently well tolerated by the patient in spite of his congenital heart disease, but it did not check the progression of the disease. The severe cardiac condition did not seem to affect the outcome of the pulmonary tuberculosis.—*Estenosis congenita de la arteria pulmonary tuberculosis, V. N. Marco & J. H. Romero, Rev. espãn. de tuberc., May, 1951, No. 194: 285.*—(*L. Molnar*)

17-Keto-Steroids.—The urinary output of 17-keto-steroids was studied in 70 patients with pulmonary tuberculosis before the institution of any therapy. Highly febrile patients and those with a daily urinary volume of less than 500 cc. were not included in this series. A minimum level of 10 mg. in men and 7 mg. in women was considered normal. Definitely lowered excretion of 17-keto-steroids was found in 70 per cent of the women and 73 per cent of the men. The diminution was mainly dependent on the extent and degree of activity of the pulmonary lesions. In 11 patients the urinary level of 11-oxy-steroids was determined on admission to the hospital and was found low in 45 per cent (1.0 mg. being considered the normal value). In 21 cases of tuberculosis of long standing, the urinary level of 11-oxy-steroids was determined during treatment and found diminished in 38 per cent. In 17 patients the simultaneous variations of 11-oxy-steroids and 17-keto-steroids were studied. In 7 patients both remained definitely below normal. These were mostly cases of bilateral cavitary tuberculosis not responding to any treatment. In 5 patients an elevation of the two levels coincided with definite improvement of the general condition and the pulmonary pathology under the influence of antibiotics, collapse therapy, or bed rest; in the remaining 5 patients in whom the course was equally favorable, there was elevation of the 11-oxy-steroid levels, while the 17-keto-steroids remained. low.—*Étude de l'élimination urinaire des 17-céto-stéroides, des 11-oxy-stéroides et du test de Thorn dans la tuberculose pulmonaire chronique, G. Brouet, M. Girard,*

J. Marche, R. Bourdon, C. Choffel, Thevenet, & Laroche, Rev. de la tuberc., 1951, 15: 691.—(V. Leites)

Serum Proteins in Tuberculosis.—Serum proteins were studied in 152 patients with pulmonary tuberculosis. The most significant alteration appeared in the serum albumin and, in general, the more severe the disease, the lower was the albumin concentration. The albumins are responsible for nearly 80 per cent of the colloidal osmotic pressure exerted by the plasma. Loss of positive osmotic pressure will induce a transudation of the smaller albumin molecules to the tissues and into the alveoli as an albuminous fluid. Such a decrease in plasma albumin, caused either by accelerated protein catabolism or by disturbed protein synthesis, would thus lower the plasma osmotic pressure and increase the edema in the lung. Conversely, if the plasma albumin and osmotic pressure were raised, the process might be reversed; the lung might become less moist and less likely to encourage the spread of the tuberculosis. The findings seem to justify further experiments directed toward raising the albumin level and thus altering the course of the disease.—*Serum protein levels and calculated osmotic pressures in tuberculosis: I. Correlation of these values with the severity of the disease, R. M. Eaton, J. V. Sherwood, P. L. Kendrick, G. Eldering, & R. Daume, J. Thoracic Surg., April, 1951, 21: 342.—(R. E. MacQuigg)*

Blood Volume in Tuberculosis.—Blood volume studies were done in 26 adult patients with active advanced or moderately advanced pulmonary tuberculosis by the use of P^{32} labeled red blood cells. In 24 of the patients, the total blood volume, the total red cell volume, and the plasma volume were reduced. In 2 of the patients, blood volume and total red cell volume were elevated; these patients probably had secondary polycythemia due to pulmonary fibrosis.—*Blood volume in pulmonary tuberculosis, N. L. Berlin, D. F. Rowles, G. M. Hyde, R. J. Parsons, J. H. Lawrence, & S. Port, A. M. A. Arch. Int. Med., July, 1951, 88: 17.—(G. C. Leiner)*

Late Function Changes After Thoracoplasty.—Cournand and his co-workers concluded that the reduction in maximum breathing capacity following a standard seven-rib thoracoplasty as a rule was not greater than 15 per cent. They observed that when scoliosis developed, the maximum breathing capacity was further reduced, resulting in a tendency to dyspnea on mild exercise. The present investigation was made on 24 patients with a therapeutically successful thoracoplasty three to twenty-seven years earlier. Scoliosis was invariably accompanied by a significant loss in ventilatory function. Frequently the number of ribs resected did not determine the functional result; rather the individual's preoperative ventilatory function largely determined the postoperative result. Removal of the first rib together with long anterior segments of the second, third, and fourth ribs and the transverse processes was usually associated with the appearance of scoliosis. The preservation of long anterior segments seemed most important in limiting the deformity. Scoliosis may also be limited by the presence of an empyema with resulting fibrosis of the pleura and fixation of the thoracic cage, by the lapse of a long interval between stages, and finally by adequate physical therapy. The catching of the scapular tip beneath a rib has frequently been associated with severe and progressive scoliosis. With lesions requiring the removal of long anterior segments, a better functional result may be obtained by combining pulmonary resection with a less radical thoracoplasty.—*Late changes in ventilatory function following thoracoplasty, S. R. Powers, Jr. & A. Himmelstein, J. Thoracic Surg., July, 1951, 22: 45.—(R. E. MacQuigg)*

Thoracoplasty Results.—Of 2,800 patients hospitalized between 1933 and 1948 in a French student sanatorium, 221 (8 per cent) had thoracoplasties. The results were evaluated after an observation period ranging from two and one-half to sixteen and one-half years.

Of the thoracoplasties, 42 per cent consisted of resection of four ribs and less; 35 per cent, of five or six ribs; and 25 per cent, of seven ribs and more. One per cent were basal thoracoplasties; 10 per cent had anterior stages. In 30 per cent of the patients, apicolysis was also employed. Phrenic nerve paralysis was performed in 20 per cent of the cases; 3.6 per cent has associated Monaldi drainage. The indications for thoracoplasty were broad: 40 per cent of the patients had far advanced disease, 15 per cent had large cavities, and 35 per cent had soft contralateral lesions at the time of operation. None of the patients received streptomycin. The over-all mortality was 12.7 per cent: 4 patients died during the operation of hemorrhage or shock, 3 postoperative deaths were due to pulmonary edema and infarction, 6 were due to wound infection, and 12 were due to progression of the tuberculosis less than two years after the last stage. One patient died later as a consequence of cavernostomy; another following sigmoidostomy for intestinal tuberculosis. This mortality figure includes many early cases; during 1948 and 1949 there were no postoperative deaths. In all, there were 8 late deaths due to progression of tuberculosis: 5 of contralateral disease, 3 of progression under the thoracoplasty. At the time of writing 5 per cent of the thoracoplasty patients still had active disease; 77.4 per cent were considered cured by strict roentgenologic, bacteriologic, and clinical criteria; of these, 69.2 per cent had an uneventful course without reactivation after discharge. The remaining 8 per cent could be considered as cured only after a prolonged time, either because of transient exacerbation or because the thoracoplasty became effective only later. In 9 cases cavernostomy had to be performed in addition to thoracoplasty. Of the cured patients, 75 per cent were able either to start or to resume normal professional activity; approximately 30 per cent began their work less than a year after the operation; 40 per cent, after one or two years; 16 per cent, after two or three years; 9 per cent, after three to five years; and 2.5 per cent, after more than five years. The following factors were found to have no influence on the success of the thoracoplasty: apicolysis, phrenic nerve paralysis, age or sex of the patient, age of the lesion, and preceding pleurisy or obliteration of the pleural space due to pneumothorax. On the other hand, the prognosis of thoracoplasty was influenced adversely by preoperative weight loss, increased sedimentation rate, thermic instability, and abundant expectoration. Of the roentgenologic signs, no prognostic value could be attached to extent of the lesion, contralateral disease, or signs of retraction. The size of the cavity influenced greatly the postoperative results since only 45 per cent of patients with large cavities were considered cured as compared with 88 per cent of cures in the remaining cases. The results of thoracoplasty patients are superior if compared with the over-all frequency of cures in all other cases. Since the patients of this sanatorium were all young intellectuals, their results were also compared with another series of patients of the same age group belonging to the manual trades. The latter had an over-all mortality of 25 per cent compared with 15 per cent among the students. This difference is attributed mainly to living and working conditions after sanatorium discharge.—*Résultats éloignées de 225 thoracoplasties d'indication pulmonaire faites au Sanatorium des Étudiants de Saint-Hilaire-du-Touvet de 1933–1948, étude des taux de gérison en fonction des aspects radio-cliniques des lésions operées, A. Bonniot, D. Douady, R. Cohen, & P. Bosquet, Rev. de la tuberc., 1951, 15: 505.*—(*V. Leites*)

Plastic Plombage.—Animals were used to determine the suitability as plombage substances of a series of plastic and synthetic materials. A formalized polyvinyl alcohol, Ivalon, had the most desirable physical characteristics, appeared to have no undesirable toxic or chemical reactions towards animal tissue, and produced such a fibrinogenic response that it became completely infiltrated with fibrous and collagenous tissue. This material has been used 17 times in 14 operations, 10 times for extrapleural plombage, 5 times to fill the space some time after an extrapleural

pneumothorax, and twice as a prosthesis following resection. The postoperative courses were all uneventful and sputum conversion took place in all instances.—*The use of plastic sponge in surgical treatment of pulmonary tuberculosis, A. Hurst, J. B. Grow, S. Levine, & H. M. Perlmutter, Dis. of Chest, August, 1951, 20: 134.—(E. A. Rouff)*

Changes in Function After Surgery.—Forty patients were studied before pneumonectomy, at weekly, and later at monthly, intervasl thereafter up to two and one-half years. Pneumonectomy without further treatment was followed by a variable amount of overdistention, the severity being unpredictable before operation. Maintenance of pneumothorax within the space after operation entirely prevented overdistention and was not accompanied by further reduction of function. Conversion of the pneumothorax to oleothorax caused no alteration of pulmonary volume or function. Early thoracoplasty, six weeks to two months after resection, prevented overdistention on deep inspiration by reducing the vital capacity but did not entirely prevent overdistention in the pulmonary mid-position. This procedure caused a further loss of maximum breathing capacity. Late thoracoplasty, six months to two years after resection, corrected existing overdistention only partially and caused a further permanent reduction of vital capacity and maximum breathing capacity. Primary resection of a functionless lung caused no further loss of function but the loss of function was marked after thoracoplasty over a functionless lung. No definite indications were obtained that overdistention following pneumonectomy in young patients results in true emphysema with disruption of the pulmonary parenchyma during the first two and one-half years after operation. Progression of true emphysema after pneumonectomy in the older patients was demonstrated.—*Progressive changes in pulmonary function after pneumonectomy: The influence of thoracoplasty, pneumothorax, oleothorax, and plastic sponge plombage on the side of pneumonectomy, E. A. Gaensler & J. W. Strieder, J. Thoracic Surg., July, 1951, 22: 1.—(R. E. MacQuigg)*

Drainage for Tuberculous Meningitis.—Intracranial pressure in tuberculous meningitis often invalidates medical treatment and prevents streptomycin from penetrating the ventricles. To reduce this pressure and to obtain permanent ventricular drainage, two polythene tubes were inserted through a frontal craniotomy. They were passed subdurally underneath the right frontal lobe and the chiasma, one tube to the cisterna pontis and the other to the cisterna chiasmatica. The results were satisfactory.—*Neurochirurgische Aspecten bij de Behandeling van Tuberculeuze Meningitis, W. van Zeben, Nederl. tijdschr. v. geneesk., September 29, 1951, 95: 2922.—(J. van der Vate).*

CLINICAL STUDIES, NONTUBERCULOUS DISEASES

Air Embolism.—Air embolism exists in 2 forms, arterial and venous. Arterial air embolism is usually a complication of artificial pneumothorax, thoracentesis, or thoracic surgery. Either air is injected accidentally in the course of the procedure or venous pathways are opened and air is sucked into them before clotting can occur. In arterial embolism, the air enters a pulmonary vein, passes through the left ventricle, and reaches systemic arteries on the upper part of the body. A small amount of air can block an important artery completely; so the injection of only a few cubic centimeters of air may be fatal if it reaches a cerebral or coronary artery. If air enters the cerebral circulation, as is common if the head is higher than the aortic arch, neurologic manifestations such as aphasia, blindness, hemiplegia, or convulsions may result. In such cases, ophthalmoscopic examination may reveal air bubbles in the retinal arteries. A marbled appearance of the skin suggests air in the superficial vessels and is often found in the superiorly located portions of the body. The treatment of arterial air embolism is postural and supportive. In venous air embolism, air enters a systemic vein and reaches the right

side of the heart. The symptoms are due to obstruction of the circulation by an air trap in the right ventricle. This type of embolism occurs as a complication of surgery involving the larger veins or of transfusions and other intravenous injections. The treatment consists of placing the patient in the left lateral position, which favors the displacement of the air trap and the consequent relief of the circulatory obstruction. Death occurs from circulatory obstruction or obliteration of the pulmonary capillary bed by air.—*Air embolism, A. C. Cohen, G. C. Glinsky, G. E. Martin, & K. I. Fetterhoff, Ann. Int. Med., October, 1951, 35: 779.—(T. H. Noehren)*

Arteriovenous Fistulas.—An unusual case of pulmonary vascular enlargement occurred in a 66-year-old housewife, tending to show that arteriovenous aneurysms of the lung may exist without polycythemia or cyanosis but may be suspected on the basis of a murmur heard over the peripheral portion of the lung. The frequency with which pulmonary vascular abnormalities have been reported in the literature of late stimulates an awareness of a condition which probably is much more common than hitherto suspected. These conditions are thought to belong to the so-called heredofamilial angiomatosis (Rendu-Osler-Weber syndrome). Approximately 40 cases have been sporadically reported with rather characteristic clinical features and symptoms.—*Symptomless pulmonary arteriovenous aneurysms or fistulas, D. J. Roberts & J. E. Hutchison, Am. J. Roentgenol., November, 1951, 66: 743.—(T. H. Noehren)*

Hand - Schüller - Christian Syndrome.—A case of Hand-Schüller-Christian's syndrome occurred in a 29-year-old male industrial engineer. His chief complaints were headaches, chest pain, backache, and cough of increasing severity of three to four weeks' duration. The first difficulty had been a persistent, dry, hacking cough eighteen months prior to admission, associated with bilateral axillary masses. He was diagnosed as having sarcoidosis associated with the symptoms of diabetes insipidus. A roentgenogram of the chest showed dense interstitial fibrotic changes in both upper and middle lung fields, which were interpreted as consistent with the diagnosis of sarcoidosis. Six months previous to hospital admission, he suddenly developed a left spontaneous pneumothorax. Several thoracenteses were done, and bloody fluid was removed from the chest. One month prior to admission his coughing and chest pain increased in severity. The chest was symmetrical and respiratory excursions were unimpaired. The lungs were clear on auscultation and percussion, although a questionable coarse friction rub was present over the left hemithorax. Roentgenograms of the chest exhibited the same generalized pulmonary interstitial fibrosis illustrated previously. Approximately fourteen days after admission, the patient noticed the sudden onset of severe right chest pain following a paroxysm of coughing. He was found to have a right pneumothorax. A second spontaneous pneumothorax occurred, involving the same lung. The diagnosis of Hand-Schüller-Christian's disease was ultimately made, and treatment with corticotropin instituted. Approximately thirty minutes after the injection, he developed a marked erythema with generalized urticaria and became markedly dyspneic with manifest asthmatic rales. Spontaneous pneumothorax was found. Following several unsuccessful attempts to re-expand the right lung, a thoracotomy was performed. At operation the right lung was seen to exhibit far advanced pulmonary fibrosis with bullous emphysema. Biopsy of the lung revealed thickening and vascularization of the pleura, thickening of the alveolar walls and interstitial septa from scarring, and infiltration by histiocytes and inflammatory cells, including plasma cells and some eosinophils. These changes were considered as those of an active progressive Hand-Schüller-Christian's disease. Corticotropin and cortisone therapy gave equivocal results and radiation therapy was started. It is interesting that in 1893 when Hand first reported a case of this disease, it was entitled "General Tuberculosis." At present, the fundamental etiology of this condition is not known,

although the pathologic physiology is reasonably well established.—*A case of Hand-Schüller-Christian syndrome treated with cortisone, W. H. Blahd, M. S. Levy, & S. H. Bassett, Ann. Int. Med., October, 1951, 35: 927.—(T. H. Noehren)*

Graphite Pneumoconiosis.—Little attention has been paid to the effects of graphite dust on the lung in spite of the fact that large numbers of workers in many industries are constantly exposed to it. Any occupational risk from graphite exposure has usually been reported as due to the silica component of the inhaled dust, and graphite pneumoconiosis has been considered an anthracosilicosis. Graphite or plumbago is one of the allotropic forms of crystalline carbon and is obtained from mines or open quarries. Some deposits appear to consist of practically pure graphite, while others contain as much as 33 per cent of impurities, particularly silica and iron. Persons engaged in mining or grinding graphite appear to be exposed to the greatest dust hazard. Most of the investigations on the effect of graphite dust on the lungs of industrial workers have been based on radiological evidence only. In one case of graphite pneumoconiosis, histologic studies have been possible. The patient, a 49-year-old man, was hospitalized for suspected lung tumor. For five years, more than thirty years ago, the patient had worked in a graphite mine in Ontario. Since then he had been the manager of a garage. There had been some dyspnea on exertion, and he had been spitting some "heavy-colored stuff" for the past five years. A right thoracotomy was done and a black tumor mass which was the size and shape of an egg was found in the upper lobe. It was firm but not hard. There was no hilar adenopathy. A right upper lobectomy was performed, and the patient made an excellent recovery. During removal the large mass was ruptured and small amount of watery black material escaped. A very small nodule which was not removed was in the lower lobe. Histologically, the lobe showed a granulomatous reaction, characterized by areas of fibrosis, necrosis, and cavitation, with obliterative changes in blood vessels and bronchi. Large numbers of giant cells were present throughout the lesions, many of which contained asteroid bodies. The total silica content of the lung tissues was within normal limits. It is believed that the lesions in the lungs are attributable to the graphite itself and not to admixed silica.—*Graphite pneumoconiosis, F. A. Jaffé, Am. J. Path., September-October, 1951, 27: 909.—(J. S. Woolley)*

Pulmonary Fibrosis.—An unusual case of diffuse, interstitial, pulmonary fibrosis occurred in a man with a history of allergy and asthma. He had had superimposed pneumonic and influenzal infections which may have served as the basis for the fibrosis. He lived thirty-six months after the onset of symptoms and manifested osseous changes, muscular atrophies, and contractural deformities of the hands not previously reported.—*Diffuse interstitial fibrosis of the lungs, H. L. Katz & O. Auerbach, Dis. of Chest, October, 1951, 20: 366.—(E. A. Rouff)*

Pneumonia in Q Fever.—The pulmonary involvement was studied in two outbreaks of Q fever which occurred in the region of Heidelberg in the winter of 1949 and in the spring of 1950, during which 319 persons were fluoroscoped and chest films of 190 persons were taken. The diagnosis of Q fever was made on the basis of clinical and serological data in 250 persons, 51 (20 per cent) of whom showed pulmonary infiltrates. The complement fixation reaction was positive in 46 patients with infiltrates; on the other hand, there were 37 patients with positive serology with no pulmonary infiltrates. Lung involvement occurred between the fifth and seventh days of illness. The physical examination of the lungs was mostly negative. There was a certain tendency for patients with a severe clinical course to have extensive pulmonary infiltration, but the prognosis was good even in the latter. Radiologically there was solitary or multiple patchy infiltration with linear densities, predominantly in the lower lung fields, with or without hilar reaction. The pulmonary infiltrates in

some cases persisted for several weeks after defervescence and improvement in the general condition, but the resolution was then complete.—*Uber Pneumonien bei Q-Fieber, A. Laur & K. Rabenschlag, Deutsche med. Wchnschr., April 6, 1951, No. 14: 443.*—*(L. Molnar)*

Empyema Treated with Trypsin.—The proteolytic effect of trypsin was used as a coadjuvant in the treatment of purulent pleurisy and cold abscesses. After the aspiration of the pus, several hundred cubic centimeters of a solution containing 150 to 200 units of highly purified trypsin were introduced into the pleural cavity at a temperature of 37° C. The trypsin solution was left in the cavity for six to eight hours, and removal was followed by lavage with saline solution. The lavage was repeated on four to five consecutive days followed by a one-week pause, and this course was continued until the pleural cavity became dry or the fluid assumed a serous character. In cases of empyema due to a mixed infection, the lavage with trypsin was followed by the introduction of penicillin into the pleural cavity. Ten cases of closed empyema and 8 cases with residual empyema and cold abscess with sinus tracts were treated with the above method. In the first group, complete re-expansion of the lung was obtained in 4 cases and in another case the lung is in re-expansion; in 3 other cases of this group the amount of fluid is decreasing and is more serous in character; the presence of a bronchopleural fistula in these cases has obviously interfered with the effect of the treatment. In 4 cases of the second group, complete closure of the residual empyema cavity or of the sinus tracts was observed, and in the remaining 4 cases the size of the cavity is diminishing and the amount of secretion is decreasing. Although the results obtained in this limited series of cases do not warrant definite conclusions, they are sufficiently encouraging to justify further trials on a larger scale.— *Spülbehandlung tuberkulöser und mischinfizierter Pleuraempyeme mit Trypsinlösung, H. Klüppelberg, Deutsche med. Wchnschr., July 28, 1950, No. 29/30:987.* —*(L. Molnar)*

Hemosiderosis.—The syndrome of pulmonary hemosiderosis occurs in 2 distinct groups of patients: children with severe anemias and adults with mitral stenosis secondary to rheumatic heart disease. Although mitral stenosis occurs more frequently in women than in men, more cases of pulmonary hemosiderosis have been reported in men, in the majority of whom repeated episodes of hemoptysis have occurred. Among 5 cases of hemosiderosis associated with mitral stenosis, one showed many hemosiderin-containing, "heart failure" cells in the sputum. In 3 others, pulmonary aspiration biopsy showed numerous "heart failure" cells, many containing hemosiderin. The most likely source for these miliary deposits is recurrent small bleeding into alveoli with siderin deposition into discrete, interspaced clusters of alveoli. Since hemoptysis is much more frequent as a complication of mitral stenosis than is pulmonary hemosiderosis, some other factor must be involved. This factor may be edema and venous congestion causing obstruction to the normal lymphatic drainage of the alveolar histiocytes responsible for the phagocytization of intra-alveolar red cells.—*Pulmonary haemosiderosis, P. Ellman & A. Gee, Brit. M. J., August 18, 1951, No. 4728: 384.*—*(E. A. Riley)*

Electrocardiogram in Heart Tumors.—The heart muscle may be invaded by malignant tumors, either by contiguity from a thoracic organ or by blood-borne metastases from an extrathoracic tumor. Primary or metastatic heart tumor may be suspected clinically in the presence of heart conditions of unclear etiology and with unusual behavior sometimes associated with pericarditis with effusion. A study was made of the electrocardiographic tracings of 15 patients, 6 of whom had sarcoma and 9 carcinoma; in 12 cases the tumor was situated in the thorax; and in 3 cases it was extrathoracic, carcinoma of the uterus and of the stomach. The most frequent electrocardiographic changes were right or left bundle branch block, slurring of the QRS complex, flattening of the ST segment, inversion of the T wave, and ventricular extrasystoles or total arrhythmia.

Low voltage tracings associated with arrhythmia were observed in cases of tumors affecting the myocardium, the aorta, and the pulmonary artery. The presence of a cardiac tumor was confirmed by autopsy only in one case of a reticulosarcoma of the mediastinum with metastasis in the heart. The clinical significance of these findings is that, in a case of thoracic or extrathoracic tumor, the appearance of electrocardiographic changes for which no other etiologic factors can be found should be a definite contraindication to surgical treatment.—*Electrocardiografia y tumores malignos (toracicos y extratoracicos), B. Urzay, Rev. espān. de tuberc., June, 1951, No. 195:347.—(L. Molnar)*

Cardiac Involvement in Sarcoidosis.—A case of sarcoidosis with fatal cardiac involvement is reported. The extreme rarity of the syndrome of progressive congestive heart failure due of cardiac sarcoidosis is stressed. Boeck's sarcoidosis must be considered in the differential diagnosis of congestive heart failure of obscure etiology, especially if it occurs in a young Negro man. Other evidence of sarcoidosis in the lung parenchyma, in the hilar or peripheral lymph nodes, the liver or spleen, the bones of the hands and feet, the uveal tract, the parotid gland, and the skin may be the clue that will aid in the correct differentiation (Authors' summary).—*Sarcoidosis with fatal cardiac involvement, G. C. Adickes, S. L. Zimmerman, & E. S. Cardwell, Jr., Ann. Int. Med., October, 1951, 35: 898.—(T. H. Noehren)*

Chest Roentgenograms in Heart Disease.—In 4 patients with heart disease, chest roentgenograms showed such unusual changes that the exact diagnosis was not made initially. In a 62-year-old man with coronary insufficiency, the chest roentgenogram showed hilar engorgement and fluid in both pleural cavities. There were nodular densities in each hemithorax. The oblique roentgenogram revealed that these densities represented interlobar collections of fluid. They disappeared with improvement of the patient's condition. In a 73-year-old man in cardiac failure following myocardial infarction, the chest roentgenogram showed a homogeneous density overlying the entire right hemithorax, simulating a massive effusion. Forty-eight hours after the patient had been encouraged to lie on the left side, the density had disappeared. It had been due to anasarca which had involved mainly the right side. In a 59-year-old man with myocardial infarction, the chest roentgenogram showed nodular and reticulated densities in the upper lobes, simulating an inflammatory process. Following cardiac therapy these congestive changes, which were limited to the upper lobes due to considerable basal emphysema, disappeared rapidly. In a 39-year-old man with subacute bacterial endocarditis, the chest roentgenogram showed a well-circumscribed, rounded, nodular density in the extreme right apex, simulating a superior sulcus tumor. On autopsy, a rounded pulmonary infarct was found in the right upper lobe.—*Bizarre pulmonary roentgenographic manifestations in heart disease, W. Newman & H. G. Jacobson, Am. Heart J., August, 1951, 42: 184.—(G. C. Leiner)*

Ioduron B Bronchography.—A water-soluble contrast medium which seems to possess many advantages for bronchography has recently been produced. This substance, ioduron B, is a 3,5-diiodopyridon-4-N-acetic acid dissolved in the sodium salt of cellulose glycol acid ether, with a specific gravity of 1.29. It is highly viscous, stable, and is rapidly absorbed. The rapid elimination of the contrast medium from the bronchial tree makes it possible that subsequent variation in the appearance of the lungs need not be interpreted as a result of residual iodized oil. Furthermore, the rapidity of elimination restores the airway promptly to its prebronchographic condition, thereby making thoracic surgery feasible within twenty-four hours. In a series of 25 cases in which bronchography was done using this water-soluble contrast medium, at least 50 per cent had active or inactive tuberculosis. No immediate general reactions were encountered in any of these patients. Two of them had a

transient minimal rise of temperature not exceeding twenty-four hours. The contrast medium entered the gastrointestinal tract on 3 occasions, but no reactions were observed. Blood studies and liver and renal function tests were carried out before and after bronchography; to date no abnormalities traceable to this medium have been noted.—*Ioduron B bronchography: Preliminary report of study with water-soluble contrast medium, L. C. Brandenstein, Am. J. Roentgenol., November, 1951, 66: 769.—(T. H. Noehren)*

Blood Studies in Pneumonia.—Between the years 1945 and 1949, blood cell counts and erythrocyte sedimentation tests were done in 200 cases of pneumonia. Normal leukocyte counts were found in one-fourth of the cases of lobar pneumonia and in almost one-half of the cases of bronchopneumonia. The lowest counts were found in patients between fifty and sixty years of age; however, very high counts occurred in the older patients. The erythrocyte sedimentation rate was always high. Anemia was rarely found. There was no difference in the white blood counts between patients treated with sulfa drugs and those treated with penicillin.—*Blutveränderungen bei Pneumonien in den Nachkriegsjahren, F. J. Leibetseder & I. Rabl, Wien. klin. Wchnschr., September 14, 1951, 63: 709.—(G. C. Leiner)*

Later Therapy of Thoracic Injuries.—The 309 patients included in this study of war wounds of the chest wall and lungs were all seen two or more months after the injuries were sustained. The surgical problems encountered included hemothorax, hemopneumothorax, simple effusion, empyema, foreign bodies, bronchopleural fistulas, fibrothorax, diaphragmatic hernia, arteriovenous aneurysm, brachial plexus injuries, chest wall sinuses, and pneumothorax. Several patients had combined thoracic and abdominal injuries. Almost all patients had received generous amounts of antibiotics which sometimes masked the presence of a large hemothorax, sterile abscess, or even empyema. Most of the problems originated from hemothorax which was present at some time in 89 per cent of the patients. In 39 per cent of these cases, the hemothorax cleared up following repeated aspirations alone. Replacing the blood with air was unnecessary and invited complications, such as delayed re-expansion and massive empyema, which otherwise would have been small and limited. Penicillin was always instilled following aspiration. In 18 of 68 patients, empyema cleared up following repeated pleural lavage and intrapleural penicillin. The incidence of empyema was less if aspiration had been done prior to the patient's arrival at the hospital. In patients with chronic hemothorax, often with multilocular pockets and often sterile, thoracotomy was performed to remove fibrin and fibrous pockets containing fluid and clotted blood. This was followed in 9 patients by decortication with dissection of the organized fibrous peel from the lung. Four of these decortications were failures, probably because of the time elapsing between operation and injury, a factor also explaining the relatively small number of decortications. Empyema occurred in 68 (22 per cent) of the 309 patients. Classic methods of drainage were effectual in 29; 21 patients underwent thoracoplasties. Elective surgical procedures, undertaken two to four months after the injury, consisted of the removal of foreign bodies, repair of diaphragmatic hernias, and the treatment of arteriovenous or false aneurysms. Metallic foreign bodies were removed after considering their size, proximity to important structures, and the likelihood of future inflammatory and abscess formation. Tissue response around retained foreign bodies was often surprisingly slight. Early postoperative ambulation and corrective exercises were encouraged, since muscle atrophy was a common finding, particularly with extensive hemothorax.—*Thoracic injuries in World War II: II. Therapy in the reconstructive phase, J. P. O'Connor, U. S. Armed Forces M. J., September, 1951, 2: 1277.—(E. A. Riley)*

Pectus Excavatum.—Over a period of fourteen years an essentially standardized technique for the surgical reconstruction of the

thoracic cage for pectus excavatum has been developed. Recently cardiorespiratory studies made it possible to evaluate the results in 44 children surgically treated. Cardiorespiratory studies on infants were impracticable. Determination of the maximum breathing capacity was the best single test of the status of respiratory physiology. Electrocardiographic tracings were often reported as abnormal, though no one pattern was uniformly present or directly attributable to the chest deformity. —*Cardiorespiratory studies in pre-and post-operative funnel chest (pectus excavatum), A. L. Brown & O. Cook, Dis. of Chest, October, 1951, 20: 378.*— (*E. A. Rouff*)

ANTIMICROBIAL THERAPY

Effect of Micrococcin.—*In vitro*, 4 human and 3 bovine strains of tubercle bacilli were completely inhibited by micrococcin at concentrations of 1.6 to 12.5 γ per ml. Partial inhibition was observed at concentrations of 0.4 to 1.6 γ per ml. A series of rabbits was inoculated intravenously with 0.01 mg. of a virulent bovine strain of tubercle bacilli. Five days later, daily intravenous injection of suspensions of micrococcin were begun and continued for five to twenty days. None of the animals showed any immediate ill effects from the injections of the suspended micrococcin. The animals survived twenty-five to thirty-seven days after infection. An untreated control animal was killed with each treated animal. Neither the treated nor the control animals showed any signs of disease until approximately the sixteenth day after infection. From that time on a steady loss of weight was noted and was more marked in the treated animals than in the controls. Post-mortem examination showed that the lesions in the lungs, liver, and kidneys of the control animals were larger and more numerous than those of the treated animals, although the lungs of the latter were more solid in consistency. The lesions in the rabbits which had received large doses of micrococcin did not differ from those which were given smaller doses. Upon post-mortem examination it was observed that the tuberculous lesions in rabbits treated by intravenous injection of particulate micrococcin were at first smaller and fewer than those in the control animals but were proliferative in type and showed no regression. Also in the treated animals, there was less necrosis and caseation, which may have been due to the delayed development of hypersensitivity since the treated animals developed sensitivity to OT somewhat less rapidly than the controls. There was no prolongation of life; in fact, some of the treated animals died before the controls.—*The effect on experimental tuberculosis of the intravenous injection of micrococcin, N. P. Markham, A. Q. Wells, N. G. Heatley, and H. W. Florey, Brit. J. Exper. Path., August, 1951, 32: 353.*—(*H. J. Henderson*)

Intracisternal Streptomycin.—A series of 33 patients (15 men, 13 women, and 5 children) with tuberculous meningitis were treated with intracisternal injections of streptomycin on the following regimen: for two weeks, 100 to 150 mg. intracisternally daily with the remainder of a 1,000 mg. ampule in three doses intramuscularly; then for two weeks, no intrathecal injections but streptomycin 1 gm. daily intramuscularly. After four of these four-week courses of treatment, the intramuscular administration of streptomycin was continued for another month. The patients also received *p*-aminosalicylic acid, thiamine, ascorbic acid, and, if possible, cod-liver oil. The intrathecal injection of streptomycin was given as slowly as possible after dilution with 10 cc. of spinal fluid. The two-week rest periods were sometimes shortened but never extended. Of the 33 patients, 15 are clinically well, with negative spinal fluid; 13 are dead; 5 are still being treated, 3 of them having relapsed after discharge, probably as the result of curtailment of the treatment period. Of the 13 dead, several were in bad condition when admitted to the hospital, and 6 died before completing treatment. Of the clinically well patients, 11 suffered severe loss of hearing. The greater than average percentage of cases of deafness is ascribed to the intracisternal method of administering the streptomycin, which results in a higher concentration of the drug in the

eighth cranial nerve and nerve centers.—*Behandeling van Meningitis Tuberculosa met Streptomycine, H. K. G. Bartstra, Nederl. tijdschr. v. geneesk., September 22, 1951, 95: 2818.*—(*J. van der Vate*)

Viomycin.—Three strains of tubercle bacilli, H37Rv, strain M, and strain 38817, were studied on various media; all were sensitive to 1.0 mg. of streptomycin. The strains were equally sensitive to viomycin on Dubos medium containing Tween and plasma fraction V, on Dubos medium containing plasma fraction V and oleic acid, and on Dubos medium without Tween and with plasma fraction V. The bacteriostatic effect was demonstrated with streptomycin-sensitive and streptomycin-resistant strains. Only 3 of 5 guinea pigs infected with large numbers of tubercle bacilli and given a daily dose of viomycin, 20 mg., survived. The agent did not inhibit the generalization of the experimental tuberculous infection. No viomycin resistance was encountered in this series. Animals infected with small numbers of tubercle bacilli showed some effect of viomycin on local lesions, although scarring of the lesions by the thirtieth day was less satisfactory in animals treated with viomycin than in those receiving streptomycin. Viomycin in this dosage did not protect the animals from dissemination of the infection. No toxic manifestations to viomycin were observed.—*Étude experimentale du pouvoir tuberculostatique de la viomycine, Ch. Gernez-Rieux, A. Tacquet, & C. Chenet, Rev. de la tuberc., 1951, 15: 665.*—(*V. Leites*)

Amithiozone Determination.—The more recent methods for the quantitative determination of amithiozone (TBI/698) in body fluids use reactions with either the acetamido or the thiosemicarbazone group of the molecule. The diazo method, the calorimetric determination of a copper-thiosemicarbazone complex, and ultraviolet spectrography were used simultaneously to determine the presence of the drug in the gastrointestinal tract, in the rectum, in the uterus, and in the contents of tuberculous cavities after intracavitary instillation. These studies showed that hydrochloric acid and pepsin, animal charcoal, or a high-residue diet hinder considerably the absorption of the drug from the intestine. A considerable amount of amithiozone is destroyed by the body. With a daily dosage of amithiozone, 50 mg. two to four times by mouth, the serum concentration is considerably lower than 1:1,000,000 which was found to be the effective bacteriostatic concentration *in vitro*. Approximately 30 per cent of the thiosemicarbazone excretion occurs through the kidneys in the form of unchanged thiosemicarbazone; the concentration of the drug in the urine is, therefore, considerably above the bacteriostatic level, and this explains the good therapeutic effects in kidney and bladder tuberculosis. Good therapeutic results are obtained also in upper respiratory tract tuberculosis after inhalation, in intestinal tuberculosis after ingestion, and in tuberculous cavities after intracavitary administration; the bacteriostatic action of amithiozone in these conditions is due to the local concentration of the drug. The favorable effect of amithiozone in pulmonary tuberculosis, in spite of the inadequate concentration of the drug in the serum, might be due to a nonspecific action on the enzymatic process in the intermediary metabolism. This problem is now under study.—*Ergebnisse quantitativer Conteben-Studien und therapeutische Folgerungen, A. Sturm & W. Wernitz, Deutsche med. Wchnschr., May 25, 1951, No. 21: 705.*—(*L. Molnar*)

Neomycin for Tuberculosis.—Since preliminary *in vivo* studies indicated the usefulness of neomycin, it was tried at Olive View Sanatorium, California, in 45 patients treated with various doses for different periods. Daily doses of neomycin varied from 0.5 to 3.0 gm., given either in single daily doses or repeated doses of 0.5 or 1 gm. each; treatment was given daily, three times a week, twice a week, or once a week to different groups. More than half of the patients reported lessening in cough and diminution or thinning of their sputum while being treated, as well as improvement in

appetite. Most patients stated that they felt better; several showed slight roentgenographic improvement, but sputum conversion occurred infrequently. In general, the therapeutic response to neomycin resembled that with *p*-aminosalicylic acid (PAS) or amithiozone. Toxic manifestations included soreness at the site of inoculation, frequent nausea, 4 instances of vomiting, and one of diarrhea. Numbness and tingling in the arms, legs, and particularly in the face were noted by 12 patients. An impaired sense of balance and abnormal caloric tests were found only in those patients who had previously shown impairment following streptomycin therapy. Many complained of marked thirst and polydipsia, but there was no evidence of renal toxicity. Six patients on large daily doses had decreased auditory acuity, but no actual deafness. Smaller or intermittent doses of neomycin in connection with PAS and streptomycin may offer an additional measure for prolonging the period before resistance to these agents develops.—*The effect of neomycin in tuberculosis, in culture media, in guinea pigs, and in patients, E. Bogen, A. Djang, H. Bowman, & B. Margulies, Tuberculology, August, 1951, 12: 175.*—(*L. Levin*)

Intracavitary Chemotherapy.—Intracavitary administration of streptomycin, *p*-aminosalicylic acid, or a thiosemicarbazone was used for all cavities measuring more than 3 cm. in diameter in the first 40 cases without systemic administration, later in combination with systemic therapy. The response allows cavities to be classified (*1*) "elastic," with decrease considerably in size; (*2*) "sluggish," with decrease less than 3 cm. in one diameter only, the other diameter remaining 4 cm. or larger; and (*3*) "rigid," with little or no change. In the majority of patients, even with "rigid" cavities, there was significant improvement in the general condition. In those patients in whom the intracavitary treatment showed an "elastic" cavity, this treatment was followed by an extrapleural pneumonolysis; for "rigid" cavities, thoracoplasties were performed: for "sluggish" cavities, the type of collapse was decided upon at operation. Of 60 patients treated, 37 had "elastic," 16 had "sluggish," and 7 had "rigid" cavities. Extrapleural pneumonolysis was done in 50 patients; thoracoplasties, in 10. Intracavitary treatment is indicated only for those patients with definite indications for collapse surgery and only after they have consented to surgery. Intracavitary treatment without collapse surgery is definitely not advisable. "Rigid" or "sluggish" cavities which do not become smaller after 25 to 50 injections may respond to another drug or to a combination of drugs. —*Die Bedeutung der Antibiotica und Chemotherapeutica fur eine objektive Anzeigestellung in der Kollapschirurgie, H. Homma, Wien. klin. Wchnschr., September 7, 1951, 63: 660.*—(*G. C. Leiner*)

LABORATORY STUDIES

Lobar Deposition of Inhaled Dusts.—The rates of alveolar deposition and elimination of insoluble particulates were determined for each of the lobes of the rat lung following inhalation of uranium oxides of different mass-median particle sizes. The right superior lobe differed from the other lobes in that deposition occurred at a faster rate by 150 to 175 per cent than in any other lobe. At ten days after the start of exposure this lobe's elimination of uranium was double that of other lobes on the basis of a unit weight of lung tissue. The right median lobe also differed from the others; no elimination was detectable in a ten-day period. Nevertheless, greater amounts, both absolutely and percentagewise, were removed from the right lung than from the left after exposure, irrespective of particle size. It was found that ten times greater amounts of uranium were deposited in the alveolar spaces with UO_2 of a mass-median diameter of 0.45 μ than were deposited with U_3O_8 dust of a mass-median diameter of 2.6 μ. Eight months after exposure it was found that an average of 58 per cent of the uranium had been removed from the lung tissues.—*Lobar deposition and retention of inhaled insoluble particulates, H. E. Stokinger, L. T. Steadman, H. B. Wilson, G. E. Sylvester, S. Dziuba, & C. W. LaBelle, A.M.A. Arch.*

Indust. Hyg. & Occup. Med., October, 1951, 4: 346.—(T. H. Noehren)

Aluminum Dust and Pneumonia.—Exposing rats to high concentrations of fine aluminum dust decreased their susceptibility to lobar pneumonia produced by Type 1 pneumococci instilled intrabronchially in mucin; the mortality and case fatality rates were lower in the dust-exposed rats than in their controls. There was no appreciable difference in the incidence of infection between the dust-exposed and the control rats. This result was similar to that found in previous experiments which demonstrated that the resistance of rats to pneumococci in mucin was increased after they had been exposed to high concentrations of silica, feldspar, and bituminous coal dusts. When the pneumococci were instilled intrabronchially in broth, a rapidly developing septicemia occurred rather than lobar consolidation, and a higher mortality was noted in the dust-exposed rats than in their controls when the exposures were of long duration. There was no appreciable difference in the incidence of lobar consolidation in the dust-exposed and the control groups.—*Effect of aluminum dust on susceptibility to lobar pneumonia: Animal experiments, F. J. Vintinner, A. M. A. Arch. Indust. Hyg. & Occup. Med., September, 1951, 4: 217.—(T. H. Noehren)*

Coal Dust in Pneumonia.—Exposing rats to bituminous coal dust lowered the mortality rate and the incidence of pneumonia produced by intrabronchial instillation of Type 1 pneumococci suspended in mucin. No such protection was evident when the organisms were given in broth, a procedure which led primarily to a rapidly developing septicemia rather than to lobar consolidation. These results are similar to those obtained with silica and feldspar dust. In the coal-dust experiments, protection was evident only after fourteen or more days of exposure, whereas in the silica and feldspar experiments it was demonstrable after a few days' exposure. In similar experiments with Portland cement dust, there was no protective effect except when the exposures were much longer. The action of these agents against the mucin-conveyed pneumococci has not been explained. Since no protective effect appears when the organisms are instilled in broth, the dust may alter the action of mucin on the organisms. Only a few pneumococci are required to produce infection when they are instilled in a viscous mucin solution; much larger numbers are required if they are introduced in broth. The current theory is that the mucin protects the organisms from the defense mechanism of the body, thus permitting rapid local growth of the organisms. The dust may either adsorb the mucin or alter its physical or chemical properties so that the organisms are attacked by the body's defenses. Since various dusts protect the rats against the pneumococci in mucin, the protective action is not chemically specific. Another explanation is that the dust particles stimulate the mobilization of macrophages in the lungs, thereby increasing the local resistance against bacteria. Increased macrophage activity, however, should be evident also when the organisms are instilled in broth unless the massive dose in this case overwhelms the protective effect of the macrophages. Exposing rats for long or short periods of time to smoke from burning bituminous coal did not alter their susceptibility to Type 1 pneumococci when these organisms were instilled intrabronchially in either broth or mucin. Hence, the protection afforded by coal dust is associated only with the presence of coal dust in the lungs.—*Effect of bituminous coal dust and smoke on the lungs: Animal experiments, F. J. Vintinner & A. M. Baetjer, A. M. A. Arch. Indust. Hyg. & Occup. Med., September, 1951, 4: 206.—(T. H. Noehren)*

Carbon Dioxide and Vascular Response.—The pulmonary effects of high carbon dioxide were studied in isolated dog lungs in a constant temperature bath and perfused with heparinized dog blood under constant pressure. Shifting from normal blood (equilibrated with 3 per cent carbon dioxide, 30 per cent oxygen in nitrogen) to high carbon dioxide blood (8 to 15 per cent carbon dioxide and

30 per cent oxygen in nitrogen) for short periods resulted in a predominant reversible decrease in the outflow of blood from the ventilated and quiescent lung. This response was occasionally preceded by an initial slight increase and not infrequently followed by a late tendency to an increased flow. Increased carbon dioxide also caused a reversible increase in total lung volume and a concomitant expulsion of intrapulmonary air. The lung-volume changes are interpreted as being due to pooling of blood within the lung because of (*1*) an increased resistance to the outflow of blood as a consequence of a constrictive action of carbon dioxide on effluent vessels or on parenchymal smooth muscle, along with (*2*) a passive or active dilatation of blood-reservoir regions of the lung. The expulsion of air from the lung represents, for the most part, a constrictive effect of carbon dioxide on the smooth muscle of the bronchial tree and to some degree also an encroachment of distended blood reservoirs upon alveolar air volume. Shift to high carbon dioxide also caused a predominant decrease of inflow of blood to the lung, following an initial transient increased inflow. The results indicate that high carbon dioxide exerts a differential effect on various parts of the pulmonary vascular bed. Recognition of a regional vasodilatation must qualify any such generalization which might be arrived at simply from a consideration of inflow or outflow of blood or of alterations in pulmonary arterial pressure alone, namely, that high carbon dioxide causes a pulmonary vasoconstriction. The evidence of pooling of blood in the lung on the administration of high carbon dioxide calls for some reservation in the acceptance of the view that local reactions to gaseous changes in the lung serve to distribute the blood flow to the more adequately aerated parts. Acetylcholine evoked a sharp temporary decrease in the outflow of blood from the lung, an expulsion of intrapulmonary air, and an increase in total lung volume. Evidence is presented that this reduced outflow is due in some measure to the retention of blood within the lung in a manner similar to that resulting from the administration of high carbon dioxide indicating constriction on the venous side and a concomitant dilatation in the arterial or reservoir region of the vascular bed. Evidence is cited suggesting that carbon dioxide in the lung not only influences pulmonary vessels and parenchymal smooth muscle directly, but also facilitates their nervous control in the intact animal by virtue of its local anticholinesterase action (Authors' summary).—*Vascular response in dog lung induced by alterations in pulmonary arterial CO_2 tension and by acetylcholine, J. W. Bean, W. P. Mayo, F. O'Donnell, & G. W. Grey, Am. J. Physiol., September 1, 1951, 166: 723.*—*(G. C. Leiner)*

Slide Test for Streptomycin Resistance.—The streptomycin resistance of tubercle bacilli can be determined rapidly if slides with sputum smears are dried, immersed for six to eight minutes in 6 per cent hydrochloric or sulfuric acid, and washed two to three times in distilled water. The slides are then immersed in tubes filled with Youmans' or Karlson's liquid medium, to which streptomycin in various concentrations has been added. After eight to fourteen days' incubation, the slides are stained by the Ziehl-Neelsen method. If no tubercle bacilli have grown in the presence of streptomycin, 10 γ per cc., they are considered sensitive.—*Ueber eine Routinemethode zur Bestimmung der Streptomycinresistenz von Tuberkelbazillen, E. Stangl, Wien. klin. Wchnschr., September 7, 1951, 63: 691.*—*(G. C. Leiner)*

Acid-fast Saprophytes in Sputum.—The problem of recognizing acid-fast saprophytes in the sputum is an important one even though these microorganisms are rather rare. It has been claimed that the saprophytes can be distinguished by certain tests, without recourse to animal inoculation. In the present study an attempt is made to evaluate some of the simpler tests. The work falls in two parts: One part deals with specific tests, such as guinea pig inoculation, the "Cord" test, and the neutral red test of Dubos and Middlebrook; the other with the effect on the growth of the bacilli of such factors as temperature,

presence or absence of glycerol, varieties of medium, and use of plates instead of slants. The acid-fast bacilli were 102 strains recently isolated from sputum selected because the growth obtained on primary isolation was scanty; that is, the total number of colonies on 3 tubes of egg medium was 10 or less. Of the 102 cultures, 94 produced definite evidence of tuberculosis in guinea pigs and, in most cases, showed the following characteristics: They formed cords in liquid medium, reacted to the neutral red test, failed to grow on egg medium at 20°C. or on infusion agar at room temperature, and produced typical colonies on Dubos agar plates. Of the remaining 8 strains, one gave all the tests for nonpathogenicity, yet it infected a guinea pig and was probably a mixture of saprophyte and tubercle bacilli. The remainder, with 2 exceptions, gave most but not all the tests for nonpathogenicity which, of course, included a negative animal. Wherever results are indecisive, guinea pig inoculation remains the final criterion for the identification of tubercle bacilli.—*Acid-fast saprophytes in sputum, M. E. Clark, Am. J. Clin. Path., November, 1951, 21: 1089.*—(*J. S. Woolley*)

Parenteral Trypsin.—The mode of action and toxicity of the proteolytic enzyme of the pancreas were studied to define the optimum conditions for the treatment of empyema with trypsin. It was found that purified crystalline trypsin produced proteolysis without an intermediary activator at a pH of 7.8 to 8.5, which is a little higher than that prevailing in normal tissues. The proteolytic effect was greatest with highly purified enzyme at temperatures between 37° and 53° C. and was related to the dose and to the amount of protein to be digested. Since serum albumin inhibited proteolysis, thorough evacuation of the pleural cavity is indicated before the introduction of trypsin. Crude pancreatic enzyme causes necrosis and ulceration in animal experiments, while purified trypsin produces no tissue damage unless there is a previous lesion. The toxicity of trypsin depends on the route of administration, subcutaneous or intramuscular injection of trypsin being less toxic than the introduction of it into serous cavities, probably due to the larger surface of absorption in the latter case. Crude trypsin is more toxic than the purified variety, probably on account of its high protein content. Highly purified trypsin may also be fatal if given in high doses, not because of its proteolytic action, but rather because of the fact that even highly purified trypsin maintains its protein character.—*Zur Frage der nicht enteralen Anwendung des Trypsins, N. Gerlich, Deutsche med. Wchnschr., July 14, 1950, No. 27/28: 950.*—(*L. Molnar*)

Pulmonary Arteriovenous Fistula.—A technique for establishing pulmonary arteriovenous fistulas in dogs by limited pulmonary resection and end-to-end anastomosis of the artery and major vein supplying the removed lobes is described. In acute experiments it was found that the mean pulmonary arterial pressure decreased, the mean carotid arterial pressure increased, and arterial oxygen saturation decreased when such a fistula was opened. When, in addition, the opposite pulmonary artery was constricted, these changes were even more marked in degree. In 3 animals in which it was determined, oxygen capacity after opening the fistula was greater than before. In survival studies, 4 of 16 animals in which the procedure was carried out survived for weeks or months with arterial oxygen saturation ranging from 66 to 90 per cent. Attempts to increase the flow through the shunt by constricting the pulmonary artery of the opposite lung were unsuccessful. In 2 animals with potent fistulas, chronic hypoxemia with secondary polycythemia, hypervolemia, and increased hematocrit readings resulted. An inverse relationship between oxygen saturation and oxygen capacity was found in these animals for periods up to 65 weeks. The average cardiac output of the hypoxemic dogs fell in the same range as that of two groups of control animals (Authors' summary).—*Experimental pulmonary arteriovenous fistula, T. Takaro, H. E. Essex, &*

H. B. Burchell, Am. J. Physiol., June 1, 1951, 165: 513.—(G. C. Leiner)

Evaluation of Physical Fitness.—Exercise-tolerance tests which utilize a treadmill ergometer and multiple continuous observations have been made at three different stresses on 75 normal controls and 184 patients with symptoms or diseases involving the heart or the lungs. The capacity for moderate work (oxygen consumption increased 1.5 to 4 times) has been evaluated in terms of three fundamental aspects of performance: endurance, efficiency of oxygen uptake, and circulatory recovery. These have been integrated into an index of physical fitness for walking. Normal control values for several physiologic variables, as well as the probabilities of each of these in differentiating exercise performance in known abnormals, have been assembled. The preferred stress for this test was 10 per cent grade-walking at 1.73 miles per hour for ten minutes. The oxygen gradient between functional alveolar air and arterial blood has been measured during grade-walking in 17 patients with a variety of cardiorespiratory diseases. The significance of the physical-fitness index is that it varies inversely with this oxygen gradient. The limitations and the applications of the procedure of evaluating physical fitness in patients with clinical disease have been discussed (Authors' summary).—*Evaluation and significance of physical fitness for moderate work, R. A. Bruce, F. W. Lovejoy, Jr., P. N. G. Yu, & M. E. McDowell, A. M. A. Arch. Indust. Hyg. & Occup. Med., September, 1951, 4: 236.—(T. H. Noehren)*

Blood Agar for Streptomycin Resistance Tests.—Blood agar made with human bank blood was employed for determining the streptomycin sensitivity of *M. tuberculosis*. The blood agar consisted of hydrated Difco blood agar base plus 25 per cent human blood, together with 1 per cent glycerin. The proper amounts of hydrated agar base and glycerin were combined, sterilized, and permitted to cool to 55° C. The desired amounts of blood were then added to each flask, followed by sufficient streptomycin to give final concentrations of 1, 10, 20, and 100 γ per ml. Tubercle bacilli were isolated from sputum, gastric washing, and urine from both untreated and streptomycin-treated patients. These bacilli were transferred from the solid medium of isolation to a modified Dubos-Davis liquid medium. When sufficient dispersed growth was obtained, the tubes were each inoculated with 0.1 ml. For comparison, aliquot parts of each inoculum were inoculated on Youmans' liquid medium and Herrold's solid medium, which contained the same amounts of streptomycin. Final readings were made in twenty-one days. The solid human blood medium compares favorably with Youmans' and Herrold's media, the results with the two solid media being in closer agreement than those obtained with the liquid one. The activity of streptomycin was not influenced by the blood. Concentrations of 1, 5, 15, and 25 per cent blood showed similar sensitivity endpoints and yielded equally good growth. Growth is often visualized more readily on media containing not more than 15 per cent blood.—*Blood media for determination of sensitivity of Mycobacterium tuberculosis to streptomycin, M. S. Tarshis & A. W. Frisch, Am. J. Clin. Path., August, 1951, 21: 729.—(J. S. Woolley)*

Agar Medium for Streptomycin Sensitivity Tests.—The streptomycin sensitivity of *M. tuberculosis* can be tested on a solid medium consisting of an agar base to which, after cooling to 55° C., an enrichment containing egg-yolk, malachite green, dextrose, and a buffer are added. Streptomycin is also added so that various slants contain 1,000, 100, 10, and 1 γ per ml. of streptomycin, respectively. The medium contains no substances which interfere with the action of streptomycin. From 274 concentrated specimens of sputum, satisfactory direct tests were obtained in three to five weeks in 83 per cent; contamination occurred in 7.7 per cent, and 9.0 per cent gave too few colonies to be considered reliable. The controls for each sensitivity test consisted of a Löwenstein-Jensen and an agar slant without streptomycin inoculated at the same time.

Two slants of each dilution of streptomycin were employed in each test. The chief advantage of the test is that results are obtained in one-half the time required for the indirect method; the results are closely comparable. Another advantage is that agar slants containing streptomycin will keep in the refrigerator for at least three months.—*A direct agar culture method for testing sensitivity of M. tuberculosis to streptomycin, L. R. Peizer, D. Widelock, & A. C. Schechter, Am. J. Clin. Path., October, 1951, 21: 982.*—(*J. S. Woolley*)

Middlebrook - Dubos Hemagglutination Test.—Results of the Middlebrook - Dubos hemagglutination test have been inconclusive as to their correlation with the activity of the patient's tuberculosis. In the present investigation, an attempt was made to correlate the serum titer of hemagglutinin with this activity. Using a technique much like that of Smith and Scott, tests were performed on sera from 547 persons. In 83 patients with active pulmonary tuberculosis, a positive test at a serum dilution of 1:2 or greater was obtained in 89 per cent. There were thus 9 sera in this group which did not show the presence of hemagglutinins. If a dilution of 1:8 or higher were accepted as evidence of the activity or, at least, the presence of the disease, 79 per cent would fall into this group. Of 19 patients with nonpulmonary tuberculosis, one gave a negative test, 18 reacted with the 1:4 or higher dilution, and there were 16 positive tests with titers of 1:8 or higher. Among 411 carefully selected nontuberculous individuals, 30 per cent had no hemagglutinins; while 70 per cent gave a positive test in serum dilutions of 1:2 or higher, and 109 were positive in dilutions of 1:8 or higher. Among 34 persons with long arrested tuberculosis, 15 (44 per cent) gave positive titers of 1:8 or higher. Skin tests were not done on persons included in this survey prior to the test since injected tuberculin may stimulate the development of hemagglutinins. The value of the test as a diagnostic procedure lies in excluding tuberculosis. With the occasional exception of a patient who is severely ill with the disease, a serum titer of 1:8 or below probably excludes active tuberculosis. A positive reaction in a serum dilution of 1:8 or higher is only suggestive of active disease.—*Clinical evaluation of the Middlebrook-Dubos hemagglutination test, R. M. Young & W. A. Leonard, Jr., Am. J. Clin. Path., November, 1951, 21: 1045.*—(*J. S. Woolley*)

Tween-Albumin-Petragnani Medium.—On Tween-albumin agar, tubercle bacilli grow fast but the cultures are subject to contamination. To overcome this, penicillin has been added. The older potato-egg (Petragnani) medium gives fewer contaminations and more readily identified colonies. A medium in which liquid Tween-albumin is poured over a Petragnani slant was found to shorten the average time required for the cultivation of *M. tuberculosis* from sputum by eight days as compared with the Petragnani medium alone. Of a total of 427 unselected and consecutive specimens of sputum and gastric washings from 262 tuberculous patients, 33 per cent yielded positive results on the combined medium while 24 per cent were positive on Petragnani slants. Moreover, it was unnecessary to incorporate penicillin, which may at times inhibit the growth of *M. tuberculosis* even in as low a concentration as 50 units per ml., as contamination with other microorganisms was not a problem in this study.—*Tween-albumin Petragnani medium for cultivation of Mycobacterium tuberculosis, A. P. Wasiliew & L. W. Johnson, Am. J. Clin. Path., November, 1951, 21: 1085.*—(*J. S. Woolley*)

Hemagglutination in Extrapulmonary Tuberculosis.—The hemagglutination test was studied in 34 cases of osteo-articular and urogenital tuberculosis. No appreciable differences were noted in the specificity and sensitivity of the test in these cases as compared with those of active pulmonary tuberculosis. A positive test was obtained in 71 per cent of the cases of osteo-articular tuberculosis, at a titer of at least 1:32, which in spinal tuberculosis rose as high as 1:256. In early lesions the agglutination occurred at higher titers

than in more advanced cases. No relationship could be established between the sensitivity of the test and the prognosis. The serum of 10 patients with orchiepididymitis agglutinated at titers varying from 1:32 to 1:56. There were 7 cases with urinary tract tuberculosis; in 6, agglutination occurred at titers ranging from 1:32 to 1:256 and in only one at 1:16. In view of its specificity and sensitivity, the hemagglutination reaction may be of value in the diagnosis of extrapulmonary tuberculosis. It is possible that, using specific antigens for bovine tubercle bacilli, agglutination may occur in some cases at higher titers.—*L'emoagglutinazione secondo Middlebrook-Dubos nella diagnosi di tubercolosi a sede osteoarticolare ed urogenitale, G. Avezzu' & R. Morsica, Arch. E. Maragliano, March-April, 1951, 6: 341.*—(*L. Molnar*)

Hemagglutination and Prognosis.—The hemagglutination test of Middlebrook and Dubos was performed using sera from 90 patients with pulmonary tuberculosis at various stages and subjected to various treatments and from a control group of 61 patients with other nontuberculous diseases. A positive test with titers up to 1:32 was obtained in 6.7 per cent of the control group. The hemagglutination test was positive in 72.3 per cent of the tuberculous patients at titers ranging from 1:32 to 1:512. The patients with negative reactions or with agglutination at titers up to 1:16 mostly had recent disease or were in the older age groups and had been ill for many years. The results of the hemagglutination test were correlated with the clinical and radiologic findings as well as complete blood counts, including Benda granulograms and Arneth counts; in most cases the sedimentation rate, the plasma lipase, the plasma proteins, and allergy to tuberculin were also studied. These studies indicated that agglutination of the sensitized sheep blood cells by serum at a high dilution does not indicate an adverse prognosis; it is rather the expression of an active immune response and, therefore, of favorable significance.—*Comportamento dell' emoagglutinazione secondo Middlebrook-Dubos e stadio evolutivo del processo tubercolare, G. Avezzu' & N. Schiesaro, Arch. E. Maragliano, March-April, 1951, 6: 347.*—(*L. Molnar*)

Egg Medium for M. Tuberculosis.—A new procedure for preparing Jensen's modification of Löwenstein's medium saves time and equipment without sacrificing the qualities of the medium. The solution of salts and potato flour is autoclaved in a flask containing glass beads at 10 pounds pressure for ten minutes instead of heating the solution at 56°C. for two hours before adding the potato flour and then cooking. The presence of glass beads ensures a smooth mixture and facilitates the blending of the eggs with the base, making their preliminary homogenization unnecessary.—*A simple procedure for the preparation of egg medium for M. tuberculosis, M. W. Wheeler, J. Bact., August, 1951, 62: 244.*—(*F. G. Petrik*)

Enhancement of Antibody Formation.—Antibody formation is enhanced and prolonged when antigens are injected in an emulsion containing a small amount of paraffin oil. The addition of killed *Mycobacteria* to the antigen mixtures augments antibody formation and has a striking effect on sensitization. With the aid of emulsifying agents, various antigens in aqueous solution or suspension were emulsified in paraffin oil containing killed tubercle bacilli, and their effects were studied. Guinea pigs receiving horse serum in this way formed anti-horse serum protein precipitins in great abundance, and their skin sensitivity to horse serum was of high intensity. In addition, the character of the skin reaction was altered; it was of the tuberculin rather than the anaphylactic type. Employing diverse antigens, such as proteins, bacteria, and viruses, it was found that paraffin oil alone increased antibody formation but had little effect on sensitization. The addition of killed *Mycobacteria* strikingly promoted sensitization but, depending on the antigen, did or did not increase antibody production conspicuously above that effected by paraffin oil. An oil-in-water emulsion was ineffective because the aqueous phase, contain-

ing the antigen, separated too easily from the oil. No vegetable oil could serve as a substitute for hydrocarbons which are resistant to the host's enzymes. Both pathogenic and saprophytic killed *Mycobacteria* were effective. Killed *Nocardia asteroides* which are acid-fast, but not acid-alcohol fast, could be substituted for *Mycobacteria*. The effectiveness of the adjuvant was illustrated in various ways. Killed malarial parasites produced little or no immunity to malaria in monkeys, whereas when introduced with adjuvants an effective immunity was obtained; the presence of killed tubercle bacilli in the vaccine was found to be essential. Employing these adjuvants, a method was available for the rapid production of disseminated encephalomyelitis in animals. There are limitations to the use of immunization and sensitization with adjuvants in man. The injection of killed *Mycobacteria* may cause cold abcesses, although paraffin oil of low melting point causes little irritation. Influenza vaccine in water-in-oil emulsion without tubercle bacilli gave higher and longer sustained antibody titers than vaccine in salt solution. Typhus fever vaccines in oil and pollen extracts prepared with oil have given improved results. The mode of action of the water-in-oil emulsions of antigen with or without *Mycobacteria* has not been elucidated. The absorption, destruction, and elimination of the antigen are retarded. Paraffin oil itself causes mild inflammation with infiltration by monocytes, leading to fibrosis. It promotes the formation of a tubercle in the presence of pathogenic or saprophytic bacteria. These inflammatory cells may have a conspicuous role in the production of antibodies and sensitization. Excision experiments have shown that the synergistic effect of oil is not merely a depot effect. Excision of a site one-half hour after injection did not prevent antibody formation; after one day, excision had little or no effect. A chemical fraction of *Mycobacteria* may be responsible for some of their potentiating action or the cells which accumulate around the antigens may mediate the immune response.—*The effect of paraffin oil and Mycobacteria on antibody formation and sensitization: A review, J. Freund, Am. J. Clin. Path., July, 1951, 21: 645.*—(*J. S. Woolley*)

Intrapleural Pressures.—Simultaneous recordings were obtained of intra-oral and intrapleural pressures in patients subjected to artificial pneumothorax. Study of these recordings indicated that, during forced expiration with the glottis open, the intrapleural pressure was less than the intra-oral pressure by an average of 6.7 mm. of mercury and that this difference remained essentially constant throughout varying phases of this maneuver. During quiet inspiration and expiration, the average peak intrapleural pressure differed from the intra-oral pressure by a similar but smaller amount. A lag of the intrapleural pressure behind the intra-oral pressure was also noted. It was pointed out that it would be possible to calculate the net intrapleural pressure during a Valsalva-like maneuver with the glottis open by substituting the intra-oral pressure for the intrapleural pressure with a correction factor of approximately 6 to 7 mm. of mercury.—*Value of intra-oral pressure as a measure of intrapleural pressure, E. I. Elisberg, H. Goldberg, & G. L. Snider, J. Appl. Physiol., September, 1951, 4: 171.*—(*W. J. Osher*)

Resuscitation.—Fulminating anoxia was produced in dogs made to breathe pure nitrogen. Successful resuscitation could be accomplished by a single insufflation of a volume of pure oxygen equal to the vital capacity, by periodic insufflation of a mixture containing 2 per cent oxygen at a rate of 40 times per minute, by periodic insufflation of 4 cc. of air per kg., or by periodic insufflation of air at a pressure of 5 cm. of water. Insufflation of pure nitrogen, mixtures of 0.5 per cent oxygen in nitrogen, or air in volumes less than 4 cc. per kg. were all unsuccessful. Response to the above measures, when successful, were first indicated by a restoration of the falling systolic arterial pressure. These data indicated that only very small amounts of oxygen are necessary for resuscitation from fulminating anoxia and that these are important mainly to restore the failing circulation.—*Require-*

ments for resuscitation by artificial respiration in fulminating anoxia, M. Brucer & H. G. Swann, J. Appl. Physiol., February, 1951, 3: 479.—(W. J. Osher)

Bronchomotor Reflexes.—Bronchomotor responses, either bronchodilator or bronchoconstrictor, were elicited in both dogs and cats following electrical stimulation of the carotid sinus nerves. Stimulation of the aortic nerves produced almost exclusively bronchodilatation. The bronchoconstrictor responses were potentiated by eserine and could be abolished by atropine, section of both vagosympathetic nerves in dogs, or both cervical vagus nerves in cats. Bronchodilator responses could be abolished or altered by section of the sympathetic nerve supply to the lungs. Experiments on the isolated, perfused carotid sinus showed that stimulation of the baroreceptors by an increase in perfusion pressure resulted only in bronchoconstriction and that stimulation of the chemoreceptors by lobeline or sodium cyanide resulted only in bronchodilatation. Similar chemical stimulation of the aortic bodies caused bronchodilatation also, and this could be abolished by inactivation of the aortic chemoreceptors by acetic acid or section of the sympathetic nerve supply to the lungs. It was thus indicated that the above bronchomotor activity was reflex and its nature was determined by the afferents stimulated.—*Reflex bronchomotor responses to stimulation of receptors in the regions of the carotid sinus and arch of the aorta in the dog and cat, M. de Burgh Daly & A. Schweitzer, J. Physiol., May 28, 1951, 113: 442.—(W. J. Osher)*

Bronchomotor Nerve Fibers.—Bronchomotor responses of anesthetized cats were measured in the majority of these experiments by changes in the volume of the tidal air during constant artificial respiration. Stimulation of the caudal end of the cut cervical sympathetic nerves produced bronchodilatation, occasionally followed by bronchoconstriction. Following application of nicotine to the stellate ganglion and/or the middle cervical ganglion, the response could not be elicited. This was taken as evidence indicating that the bronchomotor effects resulted from stimulation of preganglionic fibers found in the cervical sympathetic nerves. This was further suggested by the observation that application of nicotine to the superior cervical ganglion had no effect. Nerve degeneration experiments indicated that the preganglionic fibers arose from a source cephalad to the superior cervical ganglion and issued from the upper segments of the thoracic sympathetic flow. These experiments also indicated that the postganglionic fibers had their cells of origin in the stellate and middle cervical ganglia. The bronchodilator response was noted to be unaffected by eserine and ergotoxine, but potentiated by ephedrine and cocaine, suggesting that the fibers were adrenergic in nature.—*The origin, course and nature of bronchomotor fibres in the cervical sympathetic nerve of the cat, M. de Burgh Daly & L. E. Mount, J. Physiol., March 19, 1951, 113: 43.—(W. J. Osher)*

Adaptation to Anoxia.—Respiratory adaptations to prolonged anoxia were studied in 3 patients suffering from the tetralogy of Fallot. Data were obtained to calculate the mean capillary oxygen tensions of the subjects, and it was found that these tensions, though significantly reduced from normal values, were adequate to supply the oxygen needs. This appeared to be accomplished by a marked reduction in the arterial-capillary oxygen tension gradient and thus the maintenance of a relatively high capillary oxygen tension. Adequate oxygen transport in the face of this low gradient could apparently be accounted for by the normal sigmoid characteristics of the oxygen dissociation curve of hemoglobin. Thus, at this degree of anoxia relatively large quantities of oxygen could be lost by hemoglobin, with little change in oxygen tension. The effect of changes in hemoglobin level, cardiac output, and tissue oxygen utilization in this type of adaptation appeared to be minor. No alteration or displacement of the oxygen dissociation curve could be demonstrated.—*Respiratory adaptations in congenital*

heart disease, J. Ernsting & R. J. Shephard, J. Physiol., February 20, 1951, 112: 332.—(W. J. Osher)

Intra-abdominal Pressure.—Measurements of intra-abdominal pressures were made in 7 human subjects by means of an intragastric balloon. Resting pressures of 6 to 17 mm. of mercury were noted and could be attributed mainly to the hydrostatic effects of the abdominal contents. A rise of pressure with inspiration and a fall with expiration were observed, with an oscillation of 0.7 to 5.8 mm. of mercury.—*Intra-abdominal pressure during quiet breathing, J. N. Mills, J. Physiol., January 30, 1951, 112: 201.—(W. J. Osher)*

Reticulin Membranes.—Although the framework of alveolar lung tissue is generally described as being composed of collagenous, elastic, and reticulin tissue, investigation of the albino rat lung shows a scarcity of collagenous and elastic fibers in the alveolar walls and an abundance of reticulin tissue which lies in sheets and membranes making up the framework of the lung. Surface reticulin membranes form a barrier between the alveolar air and the contents of the alveolar wall; the internal membranes form bridges connecting the adjacent surfaces of the alveolar walls and enclosing the capillary endothelium. In the lung the transfer of gases must occur through both the reticulin and endothelial barriers.—*Reticulin membranes in the framework of alveolar lung tissue in the albino rat, C. P. Leblond & F. D. Bertalanffy, Canad. M. A. J., September, 1951, 65: 263.—(E. A. Riley)*

Tissue Culture Studies on Liver Cells.—In cultures of tissue derived from hypersensitive animals, one must distinguish between a tuberculin and an anaphylactic type of hypersensitivity. One of the differences is that the cells of an animal with tuberculin-type hypersensitivity are killed *in vitro* by contact with the specific bacterial protein, whereas cells from an animal with the anaphylactic type of hypersensitivity are not. *In vitro* studies of isolated cells are the only adequate means of determining whether the injurious effect of the specific antigen is due to a direct action upon the cells. Up to the present, cells from the spleen and bone marrow and circulating leukocytes only have been investigated, all these cells were derived from the mesoderm. The present study deals with the sensitivity of isolated epithelial cells of a tuberculin-hypersensitive animal to the specific antigen. Rabbits were made highly sensitive to tuberculin by repeated injections of acetone-dried virulent human tubercle bacilli incorporated in paraffin oil. Minced liver from these and from normal animals was cultured so that the cells of the sensitized and control animals could be studied in the presence and absence of the specific antigen and in the presence and absence of antibody-containing rabbit serum and plasma. The hepatic epithelial cells of the sensitized rabbits were definitely affected by tuberculin (PPD) *in vitro*, as evidenced by lack of growth and by cellular injury and necrosis. The cells from normal animals were unaffected. Specific humoral or circulating antibodies were not essential for the allergic reaction. It would seem that isolated epithelial cells from a hypersensitive animal are affected by tuberculin in the same way as the cells derived from the mesoderm. The question of whether or not complement plays a role in this phenomenon is under investigation.—*Tissue culture studies on liver cells of tuberculin sensitized animals in the presence of tuberculin (purified protein derivative), J. J. Buckley, S. M. Buckley, & M. L. Keeve, Bull. Johns Hopkins Hosp., October, 1951, 89: 303.—(J. S. Woolley)*

Stellate Inclusions in Giant Cells.—Stellate inclusions were demonstrated in giant cells of 31 cases. Both surgical and necropsy material were studied. In 18 of these cases the stellate inclusions accompanied a foreign-body reaction; in 8 they were associated with tuberculoid granulomatous inflammation such as sarcoid, and the remaining 5, with inflammation and repair. Another 75 cases from the literature showed a similar distribution. These stellate inclusions have also been described

as spiculated or asteroid bodies and were formerly described as most commonly found in sarcoid lesions. In all of the present cases the stellate inclusions were found only in giant cells. They were best visualized by using the phosphotungstic acid hematoxylin staining method, although they are readily seen in routine hematoxylin and eosin sections. They resist temperatures up to 350° C. with little change and thus can not be simple or palmatin crystals. Micro-incineration at 650° C. results in the complete decomposition of the inclusions. The staining reactions, resistance to weak acids and alkalis, as well as to high temperatures, and the results of micro-incineration studies indicate that stellate inclusions are protein structures. The frequency of the association of these inclusion bodies with foreign-body reactions and the great diversity of the foreign bodies are strong evidence against these inclusions being specific for any disease entity.—*Characteristics of stellate inclusions in giant cells and the associated tissue reactions, J. A. Cunningham, Am. J. Path., September-October, 1951, 27: 761.—(J. S. Woolley)*

PUBLIC HEALTH AND EPIDEMIOLOGY

Coal Workers' Pneumoconiosis.—On the basis of more than 700 autopsies, pneumoconiosis in Welsh coal workers is now regarded as manifesting two distinct forms: (*1*) the simple or macular variety, which can be attributed only to the action of dust; and (*2*) the complicated or massive type believed to result from the combined effect of dust and infection. A recent investigation of the occurrence and the form of pulmonary disease in American coal workers from both hard-coal and soft-coal areas and in workers from Scottish and other coal fields afforded an opportunity of examining the general pathologic features of their disease in the light of the findings in Welsh workers. As a result, it appears that coal workers from the old and new worlds exhibit a fundamentally similar type of pneumoconiosis, which is distinct from classic silicosis. Pneumoconiosis in American hard-coal and soft-coal workers and in Scottish coal workers manifests some distinct forms, the simple and the complicated. Simple pneumoconiosis is characterized by soft dust macules, fairly evenly disposed throughout the lung substance and showing little fibrosis amongst a large amount of dust. Focal emphysema often occurs in relation to dust macules and is a striking feature of this form of the disease. The universal presence of the macular lesion indicates that it represents the essential pathologic change. The evidence suggests that simple mechanical accumulation of dust, rather than the activity of free silica, is the main factor in the genesis of simple pneumoconiosis in coal workers. There is no evidence of the operation of any agent other than the dust. The complicated form of pneumoconiosis occurs sporadically and manifests itself as densely fibrous and pigmented masses in which colliquative necrosis or tuberculosis may be present. The complicating factor is probably infective in all instances, and evidence is advanced for regarding the infection as tuberculous. In all respects there is a close correspondence, amounting to identity, between the pneumoconiosis of Welsh and that of American and Scottish coal workers. It is suggested that the term "anthracosilicosis" should be replaced by the nonspecific designation "coal workers' pneumoconiosis."—*Coal workers' pneumoconiosis, A. G. Heppleston, A. M. A. Arch. Indust. Hyg. & Occup. Med., September, 1951, 4: 270.—T. H. Nochren)*

Beryllium Excretion in Humans.—The urinary excretion of beryllium was determined in patients with pulmonary granulomatosis, in healthy workers in the beryllium industry, and in unexposed individuals. Beryllium was not detected in the urine of 35 persons who had not had occupational exposure to beryllium. Of 20 patients with chronic pulmonary granulomatosis, only 12 excreted detectable amounts of beryllium. Their daily excretion was found to be nearly constant during the experimental period. Beryllium was detected in the urine up to ten years after cessation of exposure. In the urine of healthy beryllium workers, the amount of beryllium was com-

parable to that found in the urine of patients with pulmonary granulomatosis who had worked in similar industries. The complete lack of correlation between the incidence of this disease and the degree of exposure is reflected by the fact that in general the urinary level of beryllium excreted in this disease does not differ from that of healthy individuals who have been similarly exposed. The highest excretion was found in workers who had been exposed to soluble beryllium salts in an industry in which the incidence of granulomatosis is relatively small, while the majority of cases of this disease have originated in the fluorescent lamp industry where the low excretion or absence of excretion reflects the extremely low solubility of the inhaled material. This finding is not in accord with the theory that chronic granulomatosis is caused by soluble or ionized beryllium interfering with cellular activities. It is suggested that physicochemical interaction of the surface of a solid dust particle and dissolved tissue constituents may be the ultimate cause of pathological responses.—*Beryllium excretion in humans, F. W. Klemperer, A. P. Martin, & J. Van Riper, A. M. A. Arch. Indust. Hyg. & Occup. Med., September, 1951, 4: 251.*—(*T. H. Nochren*)

Second-Strength PPD.—This study is based on tuberculin tests done on 10,000 student nurses who had lived essentially all of their lives in single places in the United States. The distribution of reactions to a first dose of 0.0001 mg. of PPD and a second dose of 0.005 mg. was plotted according to geographical areas. Reactions to the low dose, assumed to be more certain evidence of tuberculous infection, varied in frequency from 5 per cent to 30 per cent. Over the greater part of the country there was a remarkable constancy in the number of reactors to the second dose of 24 per cent. In sharp contrast, there was a higher frequency of reactors to the high dose in the area east of New Mexico and south of Kansas, Missouri, and Kentucky. In both groups the number of responses to the second-strength PPD bore no relation to the number who responded to the first strength. Among Louisiana farm residents, 72 per cent responded to the second strength and only 9 per cent to the first strength. This suggests that in this area there is a local widespread nonspecific sensitivity to tuberculin, possibly caused by infection with an organism allergenically related to tubercle bacilli. It also seems to corroborate the accumulating evidence that the maximum critical dose of tuberculin is 0.0001 mg. of PPD except in old age and in certain infectious diseases. Usually persons infected with tuberculosis respond to the low dose, and those that respond to only the higher dose represent a much less specific response.—*Studies of pulmonary findings and antigen sensitivity among student nurses: VI. Geographic differences in sensitivity to tuberculin as evidence of nonspecific allergy, C. Palmer, S. Ferebee, & O. Peterson, Pub. Health Rep., September 1, 1950, 65: 1111.*—(*S. Hadley*)

THE AMERICAN REVIEW OF TUBERCULOSIS

ABSTRACTS

Edited by LAWRENCE B. HOBSON

VOLUME 65 MAY, 1952 ABST. NO. 5

CLINICAL STUDIES, TUBERCULOSIS

Acute Tuberculous Septicemia.—In each of 3 cases of acute fulminating active hematogenous tuberculosis, the striking feature was a severe leukopenia, the total leukocyte count in all 3 instances varying between 250 and 2,050 per cu. mm. Extensive bone marrow involvement was present in the 3 cases. The condition is a rare one, only about 8 cases having been previously reported in the literature, and is characterized pathologically by a spread of necrotic foci without the usual tuberculous features other than the presence of acid-fast bacilli. No evidence was present to suggest a primary blood dyscrasia. Since the diagnosis is often obscure and since early chemotherapy is imperative, it is suggested that a sternal marrow biopsy is the most likely way of confirming the diagnosis.—*Acute tuberculous septicemia with leucopenia, K. Ball, H. Joules, & W. Pagel, Brit. M. J., October 13, 1951, No. 4736: 869.—(E. A. Riley)*

Sternal Marrow Tubercles.—Aspirated sternal marrow was subjected to histologic sectioning in 145 cases of active tuberculosis; 16 of 20 miliary cases amongst these were demonstrated to have tubercles in the marrow. Of the 4 without evidence, 3 were children. None of the 125 nonmiliary cases had marrow lesions (Authors' summary).—*Sternal marrow aspiration in miliary tuberculosis, A. B. Armstrong, W. Anderson, & J. H. Lee, Canad. M. A. J., November, 1951, 65: 468.—(E. A. Riley)*

Unrecognized Miliary Tuberculosis.—A 26-year-old woman had a hemoptysis and a negative chest roentgenogram in 1941. At the time of a second hemorrhage, a roentgenogram showed right apical infiltrations. One year later a miliary dissemination throughout the right lung was noted. The sputum was negative for acid-fast bacilli by the Pirquet method. The patient was afebrile. A diagnosis of sarcoidosis was made, and no treatment was instituted. During the next four years repeated tuberculin tests remained negative. Increasing dyspnea developed. In 1949 the tuberculin test became positive and gastric lavage revealed the presence of tubercle bacilli. The roentgenogram showed nodulation throughout both lung fields; the nodules varied in size and were of the miliary type in many areas. After rest cure and streptomycin therapy, there was almost complete roentgenologic clearing and disappearance of clinical symptoms. It is emphasized that a negative tuberculin test is frequent in miliary tuberculosis and not necessarily a sign of a particularly severe case. No abuse should be made of the diagnosis of sarcoidosis. So-called "reticular forms of tuberculosis" are too often termed sarcoidosis until subsequent events establish the tuberculous origin of the lesions.—*Granulie froide méconnue et non traitée pendant quatre ans, du fait d'une cuti réaction négative, E. Couland, Rev. de la tuberc., 1951, 15: 751.—(V. Leiter)*

Primary Infection.—Routine bronchoscopy was performed in 100 cases of primary tuberculosis in young inductees of the French Army. No untoward reactions occurred in any of the patients. In the pre-allergic phase or at the time of tuberculin conversion, 26 patients had a normal bronchoscopic picture, 4 had generalized bronchitis, 9 had localized bronchitis, and one had a primary bronchial focus. Of all the patients, 29 per cent had distortion or compression of bronchi. Patent bronchial fistulas due to tuberculous adenopathy were

found in 30 per cent of the cases.—*Primo-infection tuberculeuse dans l'armée et endoscopie bronchique (a propos de 100 observations recueillies dans l'armée)*, *H. Boucher*, *Rev. de la tuberc.*, *1951*, ***15:*** *712.*—(*V. Leites*)

Electrocardiogram in Tuberculosis.—The electrocardiograms of 476 hospitalized tuberculous patients, 142 ambulant patients with artificial pneumothorax, 258 controls, and 159 patients with rheumatic fever were studied. The frequency of abnormal electrocardiograms in the different age and sex groups ranged from 25.5 per cent to 52.8 per cent for the tuberculous individuals and from 3.2 per cent to 29.0 per cent for the controls. Abnormalities were more frequent in all groups in the tuberculosis series than in the corresponding control groups. This difference was statistically significant except in the highest age group (45 years and over) of men and in the lowest age group of women (10 to 19 years). Abnormal electrocardiograms were observed in 41.4 per cent of all of the tuberculous patients and in 15.5 of the control group. The over-all difference of 25.9 plus or minus 3.2 per cent is significant. Among the 260 electrocardiographic abnormalities in the entire tuberculosis series, low or inverted T waves were most common and occurred in 50 per cent of the abnormal electrocardiograms. In men with abnormalities, 23 per cent had a prolonged QRS interval; depressed ST segments were present in 14 per cent. In women the order was reversed and 23 per cent had depression of the ST segment while 8 per cent had a prolonged QRS interval. Low voltage was present in 5 per cent of the men and in 13 per cent of the women with abnormal tracings. Tuberculous patients had a higher heart rate and a more vertical electrical axis of the heart than the controls. The mean amplitude of the P and T waves was also lower. No correlation could be demonstrated in this study between these low P and T waves and increased electrical resistance in the chest or hypertension in the pulmonary artery (cor pulmonale). Since myocardial lesions, including interstitial myocarditis, Aschoff's nodules, and brown atrophy are often found in cases of tuberculosis at autopsy, the low P and T waves probably were due to myocardial damage and analogous to the changes in rheumatic fever. Tuberculous patients with electrocardiographic changes, particularly low voltage, had a higher mortality than other tuberculous patients. Such low voltage often occurs in diffuse myocardial damage. As the patients with other electrocardiographic changes showed a similar tendency toward a higher death rate, this may indicate that in the tuberculous patients these changes have to do with myocardial damage. Obviously, this does not warrant the conclusion that myocardial damage as such is the cause of the high death rate. It is quite likely that the myocardial lesions can be regarded in the same light as other signs of toxicity from the tuberculous process and that the functional capability of the heart may not be impaired. This assumption is borne out by the fact that heart failure seldom was seen in the tuberculous patients.—*The electrocardiogram in pulmonary tuberculosis*, *A. Björkman*, *Acta med. Scandinav.*, *1951*, ***139:*** *Supplement 255.*—(*K. T. Bird*)

Bronchogenic Carcinoma and Tuberculosis.—Between 1947 and 1950, 15 patients with simultaneous bronchogenic carcinoma and pulmonary tuberculosis were observed. No etiologic relation is believed to exist between these 2 diseases. In some of the cases, tuberculosis which had been quiescent before surgery, became progressive after the operation. This may be due to distension of the contralateral lung after pneumonectomy or due to lowered resistance. Mediastinal displacement should be avoided and streptomycin should be given prophylactically.—*Bronchuskarzinom und Tuberkulose*, *M. Wenzl*, *Wien. klin. Wchnschr.*, *September 28*, *1951*, ***63:*** *735.*—(*G. C. Leiner*)

Tuberculous Pericarditis.—A study was made of 20 cases of primary tuberculous pericarditis collected from the autopsy files of the period between 1910 and 1950 and of 21 additional cases from the clinical files of the

period between 1930 and 1950. The following conclusions are made: "The prognosis may be considered grave in the presence of advanced age (over 50 years), a gradual onset of symptoms, the occurrence of cardiac arrhythmias, and positive proof of tuberculous etiology. No prognostic significance may be given to the presence of a pericardial friction rub, pericardial effusion, or congestive failure. The mortality rate in the first year after the onset of symptoms is approximately 50 per cent".—*Tuberculous pericarditis: A study of forty-one cases with special reference to prognosis, J. A. Wood, Am. Heart J., November, 1951, 42: 737.*—(*G. C. Leiner*)

Chest Wall Tuberculosis.—Most of the 60 cases of tuberculosis of chest wall admitted to the teaching hospitals of the National Medical College of Shanghai were in young men. Roentgenographic examination revealed associated pulmonary tuberculosis in 41 cases, pleural thickening in 2, empyema and pleural effusion in one each. Extrapulmonary tuberculosis was found in 2 cases, tuberculosis of the ilium in one, and of the kidney and epididymis in another. In one patient the chest was negative roentgenographically but, at the time of operation, the lesion extended into the apex of the left lower lobe of the lung. This was partially excised and proved to be tuberculosis. In most cases, the lesion of the chest wall was extensive at the time of admission. There was sinus formation in 23 cases. In one case, tuberculosis of soft tissue and rib was found on both sides of the chest wall. In 22 cases the tuberculous lesions extended into the chest wall through the lymphatics; in 13 cases, tubercle bacilli invaded the chest wall possibly through the blood stream; and in 8 cases the lesion extended directly from the tuberculous lesion in the lung or pleura. In the remaining 17 cases, the mode of extension could not be determined. Demonstration of tubercle bacilli in the pus or pathologic study of the excised tissue established the diagnosis. The best therapeutic results were obtained by complete excision of all tuberculous tissue and obliteration of the space thus produced with living muscle flaps. Exposed cartilage, even when not apparently diseased, was resected; otherwise, necrosis and chronic chondritis interfered with healing. Repeated aspirations and local instillations of *p*-aminosalicylic acid produced a dramatic effect in a huge cold abscess of the chest wall. The abscess disappeared completely in one month. Of 53 cases treated by radical operations, the wound healed in 48 but failed to heal in 5. Among the 48 cases, the lesion recurred in 5 within two to eight months after operation. Among the unsuccessful cases, 3 were due to incomplete excision of the tuberculous tissues. Radical operation was not performed in 7 cases.—*Tuberculosis of the chest wall, M. S. Stone & C. S. Chien, Nat. Med. J. of China, 1951, 37: 582, summarized in the Chinese M. J., September-October, 1951, 69: 445.*—(*L. Hyde*)

Tuberculosis of Tibia.—Tuberculosis of the long bones is rare. An 18-year-old man was seen with cystic tuberculosis of the left tibia. The diagnosis was proved by bacteriologic and histologic examination of the tissue which had been removed surgically.—*Ein Fall einer Schafttuberkulose, A. Stupnicki, Wien. klin. Wchnschr., November 2, 1951, 63: 839.*—(*G. C. Leiner*)

Accident in Pneumoperitoneum Refill.—Pneumoperitoneum refills were given accidentally into the amniotic sac in a woman in the fourth and fifth month of pregnancy. The air introduced through a puncture on the midline, between the umbilicus and the symphysis, was well tolerated both by the mother and the fetus, in spite of a marked distension of the uterus. Although the possible dangers of this unusual accident do not seem to be very serious, a roentgenologic control before and after refills is strongly advised.—*Lufteinblasung in den schwangeren Uterus bei der Nachfüllung eines Pneumoperitoneums, R. Weiss, Fortschr. Röntgenstrahl., July, 1951, 75: 79.*—(*L. Molnar*)

Artificial Pneumothorax.—Following the

years of peak usage of artificial pneumothorax in 1942 and 1943 in the treatment of pulmonary tuberculosis at the Toronto Hospital for Tuberculosis, the use of this procedure has shown a marked decline. A detailed statistical analysis of cases treated by artificial pneumothorax was made. Of 342 instances in which this procedure was attempted, in only 47 patients (13.7 per cent) was collapse therapy terminated successfully. The over-all results were better in cases without obvious cavitation. Among 217 cases with cavities, 89 were not collapsed by artificial pneumothorax, a failure rate of 41 per cent when the procedure was employed primarily for that purpose. In evaluating results obtained in cases with a definite history or roentgenographic evidence of former pleurisy, it was believed that the procedure was hardly worth attempting when pleural inflammation antedated parenchymal disease. Favorable results varied inversely with the extent of the lesion, and best results were obtained when only one-third of the lung, usually in the midportion, was involved. Least favorable results were obtained in infiltration of the upper third. The incidence of significant complications was high. It is suggested that the use of artificial pneumothorax in the treatment of pulmonary tuberculosis be substantially reduced.—*The decline of artificial pneumothorax, W. B. Phair, Canad. M. A. J., December, 1951, 65: 542.—(E. A. Riley)*

Post-Resection Thoracoplasty.—Following resection, the vacant space can be filled only by distention of the remaining lung tissue and by deviation of the mediastinum to the operated side. Distention of a lobe or lung, in addition to creating stresses on quiescent lesions, reduces its efficiency as an aerating organ. In a series of 20 cases of pneumonectomy and 62 cases of upper lobectomy, a modified thoracoplasty was performed concomitantly with the resection in 18 and 20 cases, respectively. Prior to resection, pneumoperitoneum was induced. At the time of resection, in younger persons a temporary phrenic interruption was done in lobectomies, and a permanent interruption in pneumonectomies. Since postoperative atelectasis attributable to the phrenic interruption developed in some cases, this procedure is now deferred for a later date in older persons. In most cases of pneumonectomy, a concomitant thoracoplasty is done. In cases of upper lobectomy, the following are considered indications for concomitant thoracoplasty: contraindication to pneumoperitoneum, evidence of tuberculosis in the contralateral lung, quiescent lesions in the ipsilateral lung revealed by palpation, concomitant removal of a large left lower apical segment or the right middle lobe, and anticipated inability of the remaining lobe or lobes to fill the hemithorax as with a small lobe or in older patients.—*Thoracoplasty concomitant with resection for pulmonary tuberculosis, J. K. B. Waddington, Thorax, September, 1951, 6: 230.—(A. G. Cohen)*

Streptokinase for Extrapleural Pneumothorax.—Among 340 cases of extrapleural pneumothorax, there were 8 postoperative hemorrhages in the extrapleural space. All were successfully treated with immediate aspiration of blood, general treatment of the hemorrhage, and instillation of streptokinase into the pocket three or four days later. At this time the extrapleural space was usually filled with coagulated blood and 30,000 to 100,000 units of streptokinase were administered. Eighteen to twenty-four hours later the coagulum had been liquefied and 500 to 700 cc. of fluid blood could be withdrawn. A satisfactory extrapleural space could be re-established in all cases.—*Traitement médical des hémorrhagies après extrapleural (nouvelles observations d'action de la streptokinase), H. Métras & Ch. Gaillard, Rev. de la tubere., 1951, 15: 741.—(V. Leites)*

Bronchiectasis and Foreign Bodies.—In 4 cases of bronchiectasis an unsuspected foreign body was present. Comparison with other cases of bronchiectasis does not show these to be clinically or roentgenographically distinct, but it is of interest that hemoptysis occurred

in all of them and that none was bilateral. A foreign body lying in a bed of granulations in a bronchus is likely to cause frank hemorrhage, and this may provide a clue to its presence. The presence of an unsuspected foreign body must always be borne in mind when a case of bronchiectasis is assessed, and all operation specimens should be thoroughly examined to exclude it. Routine bronchoscopy may not reveal the presence of a foreign body which is the cause of bronchiectasis (Author's summary)—*Bronchiectasis with unsuspected foreign body, B. P. Moore, Brit. M. J., November 24, 1951, No. 4742: 1259.*—(*E. A. Riley*)

CLINICAL STUDIES, NONTUBERCULOUS DISEASES

Pneumonia.—Of 110 cases of pneumonia reviewed, 62 were lobar in distribution, 28 were segmental, and 20 were lobular. This last group showed a predilection for the older age group. In 52 cases no specific etiologic agent was identified but 21 of these received chemotherapy before admission; 29 were pneumococcal, 10 staphylococcal; 4 tuberculous; and 10 were associated with high cold agglutinin titers. There were 2 cases of Q fever and 3 doubtful cases of psittacosis. Serological evidence of recent infection with the virus of influenza B was present in 11 scattered cases. Most of the pneumococcal pneumonias showed a lobar distribution. Four of the patients with a coagulase-positive staphylococcal infection died; 3 of these 10 cases showed penicillin resistance. None of this group showed abscess formation. Two of the cases of tuberculous pneumonia were thought to have resulted from the activation of a latent focus by a staphyloccal infection. Apart from pleural effusion in 10 patients, all with pneumonia of lobar distribution and 2 of whom developed frank empyema, complications were few. A total of 10 deaths occurred, usually among the older age group.—*Pneumonia in West London, J. W. Crofton, J. W. Fawcett, D. G. James, J. G. Scadding, A. D. Macrae, & B. P. Marmion, Brit. M. J., December 8, 1951, No. 4744: 1368.*—(*E. A. Riley*)

Staphylococcal Pneumonia.—An epidemic of staphylococcal infections occurred in maternity wards and nurseries and affected mainly the baby's skin and mother's breasts. The organism, a hemolytic coagulase positive strain of *Micrococcus pyogenes* var. *aureus*, was highly resistant to sulfonamides and penicillin but quite sensitive to aureomycin. There were 6 cases of complicating staphylococcal pneumonia in infants, 3 of whom died. The roentgenograms were nonspecific in the early stages but highly suggestive if cavitation or pyopneumothorax developed.—*Staphylococcal pneumonia and pyodermia in infancy, A. J. DePape & D. S. McEwen, Canad. M. A. J., November, 1951, 65: 488.*—(*E. A. Riley*)

Pneumonia in Q Fever.—The pulmonary findings were studied in a group of patients with Q fever, hospitalized mostly on the second day of disease during an epidemic in Stuttgart in January and February, 1950. Soft homogeneous shadows of a glassy character, as well as more dense infiltrations of a cloudy appearance, were noted in 12 patients observed by the writer and in 20 other cases collected from other hospitals. The roentgenologic findings were suggestive of Q fever or virus pneumonia in approximately two-thirds of the cases. Bilateral infiltrates were observed in 2 cases; in most cases there was no hilar involvement and the shadows showed no segmental or lobar distribution. The roentgenologic appearance of pulmonary lesions in Q fever cannot be distinguished from that of virus pneumonia. The radiologic examination of the chest is important in the early detection of Q fever, for it may suggest the correct diagnosis long before a positive serologic response.—*Über Lungenverschattungen bei Q-Fieber, R. Glauner, Fortschr. Röntgenstrahl., April, 1951, 74: 411.*—(*L. Molnar*)

Primary Atypical Pneumonia.—Discussing the clinical entity of primary atypical pneumonia, the authors postulate that it is a segmented aspirational infection rather than a viral one. The one constant clinical feature of

all cases was the anatomic localization of the disease by roentgenography to bronchopulmonary segments or subsegments. Lateral films were essential for localization. Some degree of collapse within the lesion was frequent. A shift in the position of the interlobar fissures and crowding of the bronchovascular pattern usually were the only signs of collapse. The lesions were principally in dependent bronchopulmonary segments and usually followed an upper respiratory tract infection in association with some severe physical exertion, both factors being considered conducive to an aspirational infection. Postural drainage was often effective in promoting drainage and re-aeration of the affected segment. Chemotherapy can be considered of value in those cases in which a considerable element of infection is present.—*An explanation of the "primary atypical pneumonia" syndrome, P. W. Robertson & K. D. Forgan Merle, Brit. M. J., October 27, 1951, No. 4738: 994.*—(*E. A. Riley*)

Influenza.—Among 223 cases of epidemic influenza, 17 per cent showed pulmonary involvement. Of the patients with respiratory symptoms, 33 had scattered rales and impaired percussion note; 4 patients in this group developed clinical signs of consolidation which responded to antibiotics. There was little response to chemotherapy in the other group. Chest roentgenograms taken of 4 of these patients were negative.—*Lung involvement in influenza, J. Fry, Brit. M. J., December 8, 1951, No. 4744: 1374.*—(*E. A. Riley*)

Pneumonitis in Collagen Diseases.—Pathologic examination of the lungs reveals a striking similarity in most of the collagen diseases. Roentgenologically, the collagen diseases seem to be divided into two major groups: (*1*) those in which there is an acute antigenic response associated with glomerulonephritis and antigenic (azotemic) pulmonary edema; (*2*) those in which there is no indication of lung reaction up to the terminal stages of the disease. At this time, pulmonary edema may occur but it is never of the azotemic type; rather, irregular collagenous deposits appear throughout the lung field. Roentgen examination should be of aid in differentiating these two groups. The mere fact of common connective tissue involvement in all of these diseases does not preclude the possibility of a number of etiologic agents with consequent variation in response of the tissues. It may be found that such agents may also include bacterial and virus toxins of various strains and types which may, depending upon the conditions present in the body, produce a wide variety of manifestations in the tissues (Authors' summary).—*Roentgenological and pathological observations in antigenic pneumonitis: Its relationship to the collagen diseases, L. R. Sante & J. P. Wyatt, Am. J. Roentgenol., October, 1951, 66: 527.*—(*T. H. Noehren*)

Bornholm Disease.—An epidemic of Bornholm disease occurred among 66 children and 18 adults. The onset, usually sudden and consisting of severe upper abdominal or lower thoracic pleuritic pain, occurred after an incubation period of four or five days in the majority of family contacts. In 4 patients symptoms of meningitis predominated. Lumbar puncture revealed a pleocytosis in 2 of these cases. The majority of cells were lymphocytes. The usual duration of illness varied between four and five days. Recurrence of symptoms was frequent if the patients attempted to get up from bed too soon.—*An epidemic of Bornholm disease: Preliminary report, J. B. M. Davies & J. F. Warin, Brit. M. J., October 20, 1951, No. 4737: 948.*—(*E. A. Riley*)

Streptokinase and Streptodornase.—The result of the combined enzymatic action of streptokinase and streptodornase is a lysis of viscous gel-like materials. Two series of cases are reported, with 23 cases of 19 different conditions. In one series the situation was suitable for lysis; in the other it was not. The substrate was not satisfactory in actinomycosis, large gluteal fistulas, chronic tuberculous empyema, pleural effusion with incisional si-

nuses, and tuberculous meningitis. Improvement was noted in cases of lung abscess, subphrenic abscess, pararectal abscess, infected hemopneumothorax after lung resection, and chest wall abscess, as well as hemothoraces, tuberculous effusion, and so forth. The drugs provide a potent tool for liquefaction of blood and nucleoprotein but must be used carefully. The enzymes must be placed in intimate contact with the substrate.—*Experiences with streptokinase and streptodornase, G. C. Adie & W. G. Childress, Ann. Surg., October, 1951, 134: 659.*—*(W. H. Oatway, Jr.)*

Anoxia in Pulmonary Emphysema.—Extensive and detailed studies were made in 69 men with severe pulmonary emphysema. In contrast to residents of high altitudes, an increase in the hemoglobin content of the blood was seldom observed in patients with pulmonary emphysema and anoxia. Moreover, there was no evidence of increased activity of the bone marrow in 14 patients studied in this regard. The reason for this failure of hematologic adaptation to anoxia is not established but it may be related to the presence of chronic bronchial infection. On the other hand, an increase in the mean corpuscular volume regularly occurs in these patients and is apparently the result of anoxia. Breathing oxygen reduces the resting level of ventilation and leads to an increase in the carbon dioxide tension and a reduction of the pH of the arterial blood in patients with pulmonary emphysema and anoxia. Anoxia serves as an important stimulus to ventilation in these patients, and removal of this stimulus by means of oxygen therapy may result in coma associated with uncompensated respiratory acidosis. Increase in cardiac output does not appear to be an important means of adaptation to anoxia in pulmonary emphysema.—*Adaptation to anoxia in chronic pulmonary emphysema, R. H. Wilson, C. W. Borden, & R. V. Ebert, A. M. A. Arch. Int. Med., November, 1951, 88: 581.*—*(G. C. Leiner)*

Cough Fracture.—Among 106 adult nontuberculous patients referred to a chest clinic with pleural pain, cough fractures were present in 14. In all cases coughing occurred prior to the onset of pain, which usually was referred to the segment corresponding to the fractured rib or the rib below. The patients were otherwise healthy. In 8 patients the fractures were seen on oblique views of the chest only. The fractures were of the lower ribs in all instances but one.—*Cough fracture, J. B. Mitchell, Brit. M. J., December 22, 1951, No. 4746: 1492.*—*(E. A. Riley)*

Cough Fracture.—In 9 cases of cough fracture of the ribs there was no associated pulmonary tuberculosis or underlying bony pathology. Only the lower ribs were involved. In 4 cases the radiological diagnosis was made only after callous formation had occurred and review of the original roentgenograms showed no evidence of fracture. The callus may be mistaken for a parenchymal lesion.—*Cough fracture of the ribs unassociated with pulmonary tuberculosis, N. Wynn-Williams, Brit. M. J., December 22, 1951, No. 4746: 1444.*—*(E. A. Riley)*

Hyperparathyroidism and Sarcoid.—The apparent similarity between the findings in a case of primary hyperparathyroidism due to adenoma and those occasionally encountered in sarcoidosis led to diagnostic difficulties. This emphasizes the problem encountered.—*Primary hyperparathyroidism (adenoma) simulating sarcoidosis: Report of a case, H. W. Salmon & G. G. Meynell, Brit. M. J., December 15, 1951, No. 4745:1440.*—*(E. A. Riley)*

Surgical Respiratory Acidosis.—Decreased ventilatory exchange may result in acidosis due to poor elimination of carbon dioxide. This may occur with any type of surgery but is especially notable with intrathoracic operations. The anesthetic suppresses the hyperventilation which would eliminate carbon dioxide. Data from 90 patients have been obtained by sampling the arterial blood. The change did not begin until the general anesthesia was started, but moderate degrees of acidosis were sometimes present in ten or fif-

teen minutes. The most notable changes were present during any intrapleural part of a procedure. Pulmonary emphysema increased acidosis. Postoperative hypotension often followed marked acidosis, and cardiac irregularities accompanied acidosis. Ventilation usually eliminated the acidosis.—*Clinical significance of respiratory acidosis during operations, H. C. Maier, G. W. Rich, & S. Eichen, Ann. Surg., October, 1951, 134: 653.*—(*W. H. Oatway, Jr.*)

Atelectasis and Bronchial Secretions.—Postoperative atelectasis is produced by viscid secretions in the small, rather than the large, bronchi. Mucin causes the rise in viscosity. The cilial action is suppressed. Expectorants may be effective by thinning the secretions. A most effective expectorant has proved to be sodium iodide, which concentrates in the mucosa and submucosa of the bronchi and bronchioles within ten minutes of intravenous injection. The iodine concentration in the bronchial secretion rises to ten times that of the blood. The fluid volume increases at the same time. The surgeon can thus be sure of a specific agent to control bronchial secretory physiology and to prevent atelectasis and pneumonia.—*The prevention and treatment of atelectasis by the control of bronchial secretions, J. M. Baker, L. C. Roettig, & G. M. Curtis, Ann. Surg., October, 1951, 134: 641.*—(*W. H. Oatway, Jr.*).

Bronchogenic Carcinoma.—In one generation, the number of deaths from bronchogenic carcinoma in Great Britain increased fifteenfold. In the United States, the annual death rate per 100,000 was 0.58 in 1914 and 4.52 in 1935; it probably is higher now. In three large general hospitals, the number of cases of lung cancer now exceeds cancer of the stomach. The proportion of men to women ranges from 5:1 to 18:1. This fact demands explanation. The answer is not to be found in an inherent sex factor; external factors must be sought. The tremendous increase in the use of petroleum products cannot be implicated as the two sexes would be affected equally. Attention is drawn to cigarette smoking. In a study of 605 male patients with bronchogenic carcinoma, 51.2 per cent were found to have been excessive smokers (21 to 34 cigarettes daily) for more than twenty years. In comparison, of 780 unselected male patients, only 19.1 per cent were excessive smokers. Only 2 per cent of lung cancer cases were non-smokers. In male patients, 94 per cent of the lung cancer cases were of the epidermoid type. In women, 35 per cent were adenocarcinoma. It is concluded that cigarette smoking influences the incidence of epidermoid carcinoma but not of adenocarcinoma. The author regards them as almost different diseases. Bronchial adenoma may arise from a fetal bronchial bud. Adenomata may exhibit malignant tendencies which would not be influenced by smoking. This would explain the equal distribution of adenocarcinoma between the sexes. An unexplained fact is the high incidence of adrenal metastases in lung cancer. Only 25 to 30 per cent of the total number of cases suitable for operation reach the surgeon. The costly delay is attributable equally to the patient and physician. A middle-aged male patient who does not have bronchiectasis or tuberculosis and starts to expectorate bloody sputum should be suspected of carcinoma. This suspicion is strengthened if he is a heavy smoker. Of 109 cases subjected to total pneumonectomy for carcinoma prior to 1946, 21 (19.2 per cent) survived five years or more. It is possible that lobectomy, while less disabling, may produce equally good results in certain types of cases.—*Some questions about bronchogenic carcinoma, E. A. Graham, New England J. Med., September 13, 1951, 245: 389.*—(*A. G. Cohen*)

Mediastinal Liposarcoma.—Approximately 200 cases of liposarcoma have been reported in the literature. The great majority of these occur superficially on the legs, thigh, gluteal region, popliteal space, trunk, head, neck and arms. In another large group the tumors are found in the retroperitoneal, perirenal, and intra-abdominal regions. To date, the literature contains reports of only 4 cases of

liposarcoma originating in the mediastinum, to which the authors add a fifth. The outstanding features of this case are those of superior vena cava obstruction, with subsequent invasion of the vena cava and extension into the heart. Apparently under deep roentgen-ray therapy, the neoplastic tissue within the superior vena cava partially recanalized, with alleviation of the vena caval obstructive symptomatology.—*Primary liposarcoma of the mediastinum, M. C. Kozonis, R. F. Wiggers, & H. M. Golden, Ann. Int. Med., September, 1951, 35: 703.—(T. H. Noehren)*

Endobronchial Lipoma.—A proved case of endobronchial lipoma simulating a left upper lobe bronchogenic carcinoma is added to the 9 cases of proved endobronchial lipoma reported in the literature. The symptoms in all these cases were similar and did not differ diagnostically from those of other lesions causing bronchial obstruction.—*Endobronchial lipoma: Report of a case, J. C. Carlisle, W. V. Leary, & J. R. McDonald, Proc. Staff Meet., Mayo Clin., March 14, 1951, 26: 108.—(E. A. Riley)*

Intrapulmonary Thymoma.—A primary intrapulmonary thymoma of the right middle lobe occurred in a 65-year-old white woman with myasthenia gravis. Following removal of this tumor no improvement in the myasthenia gravis was noted. A thorough review of the literature failed to reveal any previously reported cases of primary intrapulmonary thymic tissue or tumor and only 2 other proved cases of thymoma located ectopically in the mediastinum.—*Primary intrapulmonary neoplasm (thymoma?) associated with myasthenia gravis: Report of a case, R. P. McBurney, O. T. Clagett, & J. R. McDonald, Proc. Staff Meet., Mayo Clin., September 12, 1951, 26: 545.—(E. A. Riley)*

Rupture of Thoracic Duct.—In a 29-year-old man a chylothorax developed on the right side following an accident while skiing. Within fifteen days, 31 liters of chyle were removed from the right chest. Although part of it was re-injected intravenously, the patient's condition deteriorated rapidly. A thoracotomy was done and the ruptured thoracic duct was ligated just above the diaphragm. Since then the patient has been well.—*Traumatische Zerreissung des Ductus thoracicus mit Chylothorax. Operative Heilung durch Unterbindung des Milchbrustganges, H. Brücke, Wien. klin. Wchnschr., October 5, 1951, 63: 763.—(G. C. Leiner)*

Rupture of the Esophagus.—Of 7 cases of esophageal rupture, one occurred spontaneously, one probably resulted from puncture by a foreign body, and 5 occurred as complications in a series of 600 consecutive gastroscopies. Rupture is more common on the left side, with extension into the left pleural cavity and a pneumothorax often of the tension type. A pathognomonic sign is the development of mediastinal emphysema and interstitial emphysema in the neck. Death may follow in twenty-four hours unless there is prompt surgical intervention. Shock is a frequent complication. Instrumental perforation is rarely recognized at the time of the examination. The first indication of a small perforation is interstitial emphysema of the neck which may be detected within two hours of the accident. Of the 7 patients, 5 died. Conservative management should be replaced by immediate surgical exploration of the site of rupture followed by closure of the perforation with external drainage of contaminated or infected tissues. Cervical perforations are best explored by cervical mediastinotomy, and perforations of the thoracic esophagus by a posterior inferior approach.—*Rupture of the esophagus, G. F. Strong, R. Wilson, & H. E. Taylor, Canad. M. A. J., November, 1951, 65: 455.—(E. A. Riley)*

Arteriovenous Angiomata of Lung.—Angioma of the lung causing anoxemia due to the arteriovenous shunt has been confused with Osler-Vaquez disease, congenital heart disease, and pulmonary tuberculosis with hemoptysis. When the shunt is fully developed

there occur dyspnea on effort, cyanosis, polycythemia, clubbed fingers, hemoptysis, and frequently paroxysmal manifestations of cerebral and cardiac anoxemia. The basis of all these is arterial oxygen deficiency. In the human lung various arteriovenous anastomoses exist: (*1*) in the bronchial wall, between branches of the pulmonary artery and the bronchial venous bed (venous blood and venous blood); (*2*) in the bronchial wall, between the bronchial artery and the intrabronchial venous bed (arterial blood and venous blood); (*3*) in the lung tissue, between branches of the pulmonary artery and pulmonary veins (venous blood and arterial blood). In the latter 2 types, mixing of arterial and venous blood occurs. Arteriovenous angiomata are frequently on the medial or interlobar surfaces, those zones of the pleuropulmonary surface which are supplied by numerous pleural branches of the pulmonary artery. The latter connect directly with the pulmonary veins without an intervening capillary network. Wide arteriovenous connections could be acquired later in life solely by a progressive widening of a normal arteriovenous circuit in the absence of a congenital angiodysplasia. Study of 57 cases of arteriovenous angiomatosis indicates a frequent hereditofamilial character. Angiomata are formed chiefly of vessels of large caliber and commonly occur in the lower lobes, particularly the right. Structurally, these angiomata may be composed of large vascular labyrinths with extreme thinning and massive thickening of the walls. Atherosclerotic and calcified lesions as well as thrombi may be present. Rupture into a bronchus or pleural space may occur. Adjacent to the vascular malformation there may be dysplastic changes in the bronchi with bronchiectasis and pseudo-adenomatous formations. Local hemosiderosis may also occur. Roentgenographic examination shows, usually in the lower lobes and predominately on the right, one or more irregular rounded densities connected with the hilum by cord-like vascular densities. Pulsation of the angioma can be demonstrated by fluoroscopy, and change in size is apparent during the Valsalva and Mueller maneuvers. A circulatory murmur is frequently audible over the angioma. Surgery is the treatment of choice. Elimination of the shunt in the lesser circulation can be attained by excising single vascular tumor after ligating the afferent and efferent vessels, or by resecting the affected lobe or lung. Compression of the vascular tumors by pneumothorax has not been successful.—*The arteriovenous angiomatosis of the lung with hypoxaemia, A. Giampalma, Acta med. Scandinav., 1950, 139: Supplement 248.*—(*K. T. Bird*)

Arteriovenous Fistulas in Thorax.—A 38-year-old Negro man experienced severe precordial pain followed by chronic severe right ventricular failure. On physical examination, a loud, continuous machinery murmur with systolic accentuation, of maximal intensity in the left second intercostal space, was heard: the pulmonic second sound was accentuated. A chest reontgenogram showed cardiac enlargement with prominence of the pulmonary conus. The findings at cardiac catheterization confirmed the clinical diagnosis of a shunt from the aorta to the pulmonary artery, probably the result of a rupture of a syphilitic aneurysm of the aorta. The patient was alive seventeen months after the rupture. A 45-year-old Mexican man experienced severe constricting pain in the right upper chest. Physical examination six months later revealed a superior vena caval obstruction syndrome and a continous high-pitched musical murmur in the right first intercostal space. Roentgenographic examination showed a large mass in the right anterior portion of the chest. The diagnosis of a rupture of the aorta into the superior vena cava was confirmed by the presence of marked pulsations of the saline columns in venous pressure determinations in the arms and increased oxygen content of the venous blood in the arms. The diagnosis was proved by the autopsy findings. A 24-year-old white man was seen with cyanosis and clubbing of the fingers, which had existed since childhood, and fever and dyspnea of three weeks' duration. On physical examination there was a harsh systolic murmur over

the second and third intercostal spaces on the right. Polycythemia was found. Chest roentgenograms showed an irregular density in the right hilar area at the basis of the right upper lobe. A diagnosis of a pulmonary hemangioma with subacute bacterial endocarditis was made. Penicillin treatment, followed by lobectomy and dissection of two smaller hemangiomas in other lobes, cured the condition. Intensification of the murmur on inspiration was noted in all 3 cases.—*Extracardiac arteriovenous fistulas in the thorax, E. J. Marchand, M. R. Hejtmancik, & G. R. Herrmann, Am. Heart J., November, 1951, 42: 682.*—(*G. C. Leiner*)

Tetralogy of Fallot.—An anatomic study was made of 48 hearts with the tetralogy of Fallot to determine the types and incidence of obstruction to pulmonary blood flow; 22 cases were observed personally, and in 26 instances descriptions of specimens were taken from the literature. In 43 of the 48 cases significant stenosis existed in the infundibulum either as the only site of obstruction to pulmonary blood flow or coupled with obstruction at the pulmonary valve. Significant obstruction at the level of the pulmonary valve occurred in 29 of the 48 cases. This obstruction was either restricted to the pulmonary valve or associated with stenosis at the infundibulum. Three cases showed atresia of the pulmonary trunk. The essential basis for the stenosis of the subpulmonary tract lay in its basic construction. There was frequent endocardial thickening, either diffuse or localized, and the infundibular wall was muscular and relatively thick. It is believed that, if a direct attack on the barrier to pulmonary blood flow is made, the attack must involve altering the nature of the infundibulum.—*Sites of obstruction to pulmonary blood flow in the tetralogy of Fallot: An anatomic study, E. C. Burke, J. W. Kirklin, & J. E. Edwards, Proc. Staff Meet., Mayo Clin., December, 19, 1951, 26: 498.*—(*E. A. Riley*)

Surgical Treatment of Mitral Stenosis.—Among 11 patients who have had commissurotomies performed for mitral stenosis since February 1, 1950, results were classified as excellent in 6 and good in 2; 2 operative deaths occurred. Postoperative left intraauricular pressures were markedly reduced on comparison with preoperative levels. Subjective improvement could not be correlated with changes in physical signs, and the majority of cases continued to have the typical signs of mitral stenosis postoperatively. Surgery is recommended for patients with a history of peripheral edema, hemoptysis, peripheral emboli, right heart failure or severe physical disability but is not recommended as a prophylactic procedure. A posterolateral approach is preferable to an anterior one. Digital fracture is not recommended. Section of the median commissure has been abandoned because of the difficulty in identification by palpation, with the subsequent risk of cutting anterior to the commissure which will result in increasing regurgitation.—*Some observations on the surgical treatment of mitral stenosis, P. David & E. Gagnon, Canad. M. A. J., November, 1951, 65: 409.*—(*E. A. Riley*)

Mechanical Heart and Lung.—Surgical correction of intracardiac defects is limited by the need for a continued blood flow into the aorta while the operative field is bloodless. After four years of experimentation, an oxygenator (Gibbon) and a pump (Dale-Schuster) have been modified and used in 64 dogs. The first human trial was in a woman whose heart defect had been explored but not corrected by the digital method. She required a heart-lung machine if she was to have the needed surgery. Although certain changes were made in the technique, the trial failed with the death of the patient, chiefly due to unexpected large blood loss and unsatisfactory replacement.—*Development of a pump-oxygenator to replace the heart and lungs; an apparatus applicable to human patients and application to one case, C. Dennis, D. S. Spreng, Jr., G. E. Nelson, K. E. Karlson, R. M. Eder, & R. L. Varco, Ann. Surg., October, 1951, 134: 709.*—(*W. H. Oatway, Jr.*).

Growth After Heart Surgery.—A total of 61 children were operated on for patent ductus arteriosus. Their growth before and after operation was evaluated by Wetzel's grid. The preoperative speed of growth tended to be reduced. The postoperative growth showed an increase in speed and a gain in physique. If surgery was done late in childhood, losses were often not regained.—*The effect of surgery on the growth of patients with patent ductus arteriosus, F. H. Adams & W. B. Forsyth, J. Pediat., September, 1951, 39: 330.*—(*W. H. Oatway, Jr.*).

ANTIMICROBIAL THERAPY

Streptomycin for Extrapulmonary Tuberculosis.—A series of 102 patients with extrapulmonary tuberculosis, mostly tuberculosis of the bones and joints, was treated with streptomycin. Fistulas due to bone and joint tuberculosis usually closed rapidly under streptomycin treatment. Development of postoperative fistulas was prevented by streptomycin. Streptomycin was not very effective in the treatment of closed forms of bone and joint tuberculosis, especially not in old closed cases. Streptomycin should not be given in cases which are known to respond to other forms of treatment. *p*-Aminosalicylic acid or amithiozone alone, given locally or orally, has no definite effect in extrapulmonary tuberculosis.—*Unsere Erfahrungen bei der Behandlung der extrapulmonalen Tuberkulose, besonders der Knochen- und Gelenktuberkulose mit den neuen Tuberkuloseheilmitteln, besonders mit Streptomycin, M. Seng & T. Pokinboroda Wien. klin. Wchnschr., November 2, 1951, 63: 836.*—(*G. C. Leiner*)

Intermittent Dihydrostreptomycin and PAS.—A group of tuberculous patients was treated with dihydrostreptomycin and *p*-aminosalicylic acid (PAS) on three days of each week for three to eight months. Specimens from 29 of these patients on one or more occasions produced tubercle bacilli by culture after three or more months of treatment, and 8 of these patients had strains of tubercle bacilli resistant to 10 or more γ of streptomycin per ml. of culture medium. Streptomycin-sensitive tubercle bacilli subsequently were recovered from 5 of these 8 patients. Only 2 patients were found to have PAS-resistant tubercle bacilli, and in both cases subsequent culture of specimens produced organisms that were PAS-sensitive (Authors' summary).—*The frequency of drug-resistant tubercle bacilli following administration of dihydrostreptomycin and para-aminosalicylic acid three days per week, A. G. Karlson, D. T. Carr, G. N. Hofmann, & K. H. Pfuetze, Proc. Staff Meet., Mayo Clin., November 7, 1951, 26: 437.*—(*E. A. Riley*)

Intrathecal Therapy of Meningitis.—A daily intrathecal injection of a solution containing streptomycin, *p*-aminosalicylic acid (PAS), and Solvoteben, a water-soluble thiosemicarbazone, was given to 20 children with tuberculous meningitis for seven months. After an observation period of ten months on the average, with a minimum of six months, 12 children were discharged free of symptoms, 4 improved considerably, one was doing worse, and 3 died. The treatment consisted of a combination of streptomycin intramuscularly and PAS orally in the usual dosage, with the intrathecal injection of the solution, prepared as follows: 0.1 cc. of a 10 per cent solution of streptomycin, 0.1 cc. of a 10 per cent solution of Solvoteben, and 0.2 cc. of a 5 per cent solution of PAS for each cc. of sterile physiologic saline solution. The dosage used was: 1 to 2 mg. of streptomycin, 1 to 1.5 mg. of Solvoteben, and 1 to 2 mg. of PAS per kg. of body weight. This mixture was administered daily in the first, second, third, fifth, and seventh months of treatment and, in particularly severe cases, even longer. It was noted that dihydrostreptomycin was much more toxic than streptomycin; damage to the cochlear portion of the eighth nerve was much more frequent when the former drug was used. The results noted with the prolonged intrathecal combined drug therapy were significantly better than those observed in a former series of patients who had been treated intrathecally for shorter periods and with streptomycin only.—*Die langdauernd verabfolgte intralumbale Strep-*

tomycin-Solvoteben-PAS Mischspritze, ein Fortschritt in der Behandlung der tuberkulösen Meningitis beim Kinde, F. Heepe & Th. Santelmann, Deutsche med. Wchnschr., August 17, 1951, No. 33/34: 1015. (L. Molnar)

Antibiotics in Spondylitis.—Very good results were obtained in the treatment of 120 cases of tuberculous spondylitis with the combination of surgery and the local application of antibiotic agents. The tuberculous foci were surgically opened and, after the removal of the caseous material and of the pus, a drainage tube was left in the cavity for the daily introduction of the antibiotics for a period of four to six weeks. With the exception of very few cases, the general condition of the patients improved rapidly, and in most cases there were signs of healing also in the bone after three to four months. The therapeutic effect of this combined method is superior to that obtained with the previously known conservative and surgical methods.—*Die tuberkulostatische Herdbehandlung der Wirbeltuberkulose, J. Kastert, Fortschr. Röntgenstrahl., May, 1951, 74: 535.—(L. Molnar)*

Amithiozone for Tuberculosis.—Amithiozone was administered for twelve or more weeks (average 18.5) to 24 male tuberculous patients ranging in age from twenty to sixty-seven years (average forty-two years). Of these, 7 had received streptomycin and para-aminosalicylic acid (PAS) previously and 13, PAS alone; a stage had been reached in which no further benefit could be expected from these drugs. All had moderately or far advanced disease. Three were unexpectedly improved, 8 improved, 9 showed no change, and 4 were worse. The sputum was "converted" in 4 cases. In cases of active disease unsuitable for collapse therapy, combined amithiozone and PAS therapy was tried, since amithiozone is thought to act directly on the organism while PAS interferes with its metabolism. Among 20 patients so treated, there was unexpected improvement in 5, improvement in 11, no change in 4, and worsening in none. Sputum conversion was effected in 12 patients. Cavity closure was effected in 3 of 18 cases. The dosage of amithiozone was 50 mg. daily for one week; then the daily dose was increased by 50 mg. each week until 200 mg. were given. The dosage of PAS was 10 gm. daily for six weeks, with the drug omitted on one day each week. No serious toxic effects were seen. The main disturbances were headache in 4, gastrointestinal upset in 4, skin changes in 2, and albuminuria and pruritus in one each. When the drug was stopped for a few days, the symptoms usually disappeared. There was symptomless enlargement of the liver in 2 patients but all the hepatic function tests were normal. No blood dyscrasias were seen. It is concluded that the combined treatment gave better results than the use of each drug separately and that the effect was comparable to that of streptomycin.—*Thiosemicarbazone (TB I), R. G. Ptasynski & A. E. K. Salvi, Tubercle, September, 1951, 32: 197.—(A. G. Cohen)*

Amithiozone for Bone Tuberculosis.—Amithiozone was given for six months, up to a total of 30 to 40 gm., to 200 adult patients with bone and joint tuberculosis. Approximately one-half of the patients showed good tolerance of the drug; approximately one-quarter had side effects for which the treatment had to be suspended; and the remainder had such severe symptoms that therapy had to be abandoned. In 46 cases, streptomycin and PAS were given in addition. Improvement in the general condition was noted in approximately one-half of 125 patients with closed lesions, sinus formation was less frequent, and the mortality was lower than in former series treated without drugs. Definite roentgenologic evidence of improvement which could be attributed to the drugs was noted in only 12 per cent of these cases, mostly in young persons with a relatively recent tuberculous process. A series of 75 cases of bone and joint tuberculosis complicated by sinus formation and mixed infection was treated with oral and parenteral administration of antituberculous agents, with penicillin and sulfonamides,

with surgical measures, and sometimes with the topical application of the agents. The following results were obtained: in 41 the process became stabilized, and the patients were discharged; in 16 the sinus tracts closed, and the bone lesions showed a tendency to consolidation; the status of 10 patients remained unchanged; in 2 there was worsening; and 6 patients died. The results were best in lesions of the flat bones, such as ribs and the sternum, in long-bone processes, and in shallow sinus tracts and fistulas. These results may be considered encouraging but they also show that the antituberculous agents act only as coadjuvants to the proved methods of treatment.—*Behandlungsergebnisse bei 200 Knochen- und Gelenktuberkulosekranken mit Tuberkulostatika, insbesondere Conteben (TB I/698), R. May, Deutsche med. Wchnschr., August 3, 1951, No. 31/32: 980.—(L. Molnar)*

Amithiozone for Tuberculous Cavity.—In a 64-year-old patient, treatment with amithiozone caused considerable decrease in the size of a large tuberculous cavity.—*Aussergewöhnliche Kavernenverkleinerung bei Altersphthise in Zuge der Contebenbehandlung, G. Berger, Wien. klin. Wchnschr., September 28, 1951, 63: 743.—(G. C. Leiner)*

Amithiozone Toxicity.—Two cases of fatal amithiozone intoxication in young children are reported. The onset was sudden in both cases, characterized by drowsiness, vomiting, accentuation of the reflexes, Cheyne-Stokes breathing and coma, terminated by death. The most important finding on post-mortem examination was an extensive fatty degeneration of the liver. Since all similar cases so far reported in the literature occurred in children, it would appear that these have a particular susceptibility towards the drug; it is, therefore, advisable to limit its use in childhood to those cases in which the gravity of the lesions warrants it.—*Conteben-Schädigung, Bericht über zwei Todesfälle bei Kindern, H. Thom, Deutsche med. Wchnschr., August 17, 1951, No. 33/34: 1014.—(L. Molnar)*

Resistance to Amithiozone.—The sensitivity of tubercle bacilli from patients not treated with amithiozone is remarkably constant provided an exactly measured inoculum is used, namely, 0.01 mg. of bacilli per 5 ml. of Youmans' medium with 10 per cent serum. The readings should be done on the eighth day. Of 20 strains originating from patients not having received amithiozone and studied under the above conditions, 14 were inhibited by 0.3 γ per ml.; 4, by 0.15 γ per ml.; and 2, by 0.60 γ per ml. on the eighth day. Six of 7 strains from patients who had received 3.5 to 2.3 gm. of amithiozone were found to have definitely higher resistance; they were not inhibited by 1.2 to 40 γ per ml. on the eighth day.—*Recherches sur la T.B.1 résistance, W. Jullien, N. Rist, & Mme. Cals, Rev. de la tubere., 1951, 15: 732.—(V. Leites)*

Viomycin in Guinea Pig Tuberculosis.—In one experiment 36 guinea pigs were infected with a streptomycin-sensitive strain of tubercle bacilli, and in another a streptomycin-resistant strain was used. Twenty-four days after infection 6 animals from each series were killed and had grossly visible lesions of tuberculosis in the usual organs of predilection. The remaining animals in each experiment were then divided into 3 groups of 10 animals each to be used, respectively, as untreated controls; a group treated with streptomycin, 6 mg. once daily per animal; and a group treated with viomycin, 20 mg. once daily per animal. Treatment was started on the twenty-fourth day of infection and was continued for 61 days when all of the surviving animals were killed. In both experiments the animals treated with viomycin had little gross or microscopic evidence of active tuberculous disease in contrast to the extensive destructive lesions in the untreated animals. In the group infected with streptomycin-sensitive tubercle bacilli, the effect of administering viomycin was comparable to that produced by the treatment with streptomycin. The streptomycin-sensitive infection and the streptomycin-resistant infection appeared to be equally beneficially affected by the adminis-

tration of viomycin (Authors' summary).—*Viomycin in tuberculosis of guinea pigs due to streptomycin-sensitive and streptomycin-resistant tubercle bacilli, A. G. Karlson & J. H. Gainer, Proc. Staff Meet., Mayo Clin., January 31, 1951, 26: 53.—(E. A. Riley)*

Intravenous PAS.—Daily injections of a stable solution of *p*-aminosalicylic acid (PAS) associated with streptomycin inhibited the emergence of streptomycin resistance in 95 per cent of cases after considerable doses of streptomycin (60 to 200 gm.). The addition of PAS infusions to streptomycin therapy may in some cases diminish already established streptomycin resistance. This phenomenon was observed in 4 patients and deserves to be studied on a larger scale. The risk of PAS resistance is negligible even if large doses (1,500 to 3,000 gm.) of the drug are administered. Patients with extensive cavitary bilateral or unilateral tuberculosis were treated with this method. The clinical results were excellent in all cases irrespective of the gravity of the disease and were superior to those observed with streptomycin and oral PAS. Of 88 cases with far advanced cavitary disease, 21 per cent had excellent roentgenologic improvement, with complete clearing and closure of cavities; 43 per cent had good results, with marked roentgenologic clearing and considerable diminution in the size of the cavities; in 20 per cent the results were mediocre, with some clearing of infiltrations but no effect on cavity size; 16 per cent were not improved.—*Étude clinique et bacteriologique de 58 cas de tuberculose pulmonaire excavée traités par l'association streptomycin-P.A.S. en perfusion courte, A. Durouz & P. I. Colétsos, Rev. de la tuberc., 1951, 15: 781.—(V. Leites)*

Antituberculous Agents and Hyperthermia.—Experimental work showed that the sensitivity of tubercle bacilli to streptomycin was considerably enhanced by cultivating the organisms at 104°F, a temperature readily attained by fever therapy. Similar results were encountered with *p*-aminosalicylic acid and *p*-acetylaminobenzaldehyde thiosemicarbazone. It is suggested that these findings may have some clinical application, such as combining chemotherapy with short periods of artificial fever therapy.—*Effects of hyperthermia and antibacterial agents on tubercle bacilli, J. Marks, Brit. M. J., December 1, 1951, No. 4743: 1318.—(E. A. Riley)*

Treatment of Pneumonia.—A trial of aureomycin and chloramphenicol in 267 cases of clinical pneumonia has been carried out at 4 centers, 2 in London, one in Sheffield, and one in Glasgow. Cases diagnosed as pneumonia on admission were allotted at random to one of 3 treatment groups: (*1*) aureomycin, (*2*) chloramphenicol, and (*3*) "standard treatment." Most of those in the last group were treated with penicillin, a few with sulfonamides. The treatment groups were found to be comparable, and the results of treatment were very similar in each group. Analysis of the patients who were desperately ill on admission, and of deaths, suggests that penicillin was at least as valuable as the other 2 antibiotics. Symptoms of drug toxicity were much more common with aureomycin and chloramphenicol than with penicillin. Compared with penicillin, treatment with aureomycin was more than 10 times as expensive and with chloramphenicol more than 9 times. In a choice between aureomycin, chloramphenicol, and penicillin, it is suggested that penicillin by injection is the best treatment for clinical pneumonia. But in this recommendation no account is taken of the possible value of the sulfonamides, which were not compared with the other drugs in the present trial (Authors' summary).—*The treatment of clinical pneumonia with antibiotics; Report by a subcommittee of the Antibiotics Clinical Trials (Non-Tuberculous) Committee of the Medical Research Council, Brit. M. J., December 8, 1951, No. 4744: 1361.—(E. A. Riley)*

Aureomycin and Penicillin for Pneumonia.—A series of 69 pneumonia patients who had either received inadequate or no chemotherapy prior to hospital admission was studied in a comparative trial of oral penicillin and aureo-

mycin. Aureomycin was given in an initial dose of 1.0 gm. followed by 0.5 gm. every six hours for three to six days. Penicillin was given in an initial dose of 80,000 to 100,000 units followed at three-hour intervals by doses of 20,000 to 60,000 units. In addition, 4 patients were given intramuscular penicillin and 2 intrapleural medications because of effusions. Positive blood cultures were obtained in 7.6 per cent. Pneumococci were isolated in 53 instances; type 2 predominated. Complications, none serious, were equally divided between the 2 groups. Results suggest that aureomycin is no more effective than penicillin in the average case. Four of the 5 deaths occurred in the penicillin series in elderly patients with cardiovascular complications. In such patients it is felt that oral penicillin is contraindicated in view of its variable absorption from the gastrointestinal tract. Treatment in these cases should be begun parenterally and oral therapy instituted only when the infection is under control.—*Aureomycin in the treatment of pneumonia, M. B. Eadie, N. R. Grist, & J. B. Landsman, Brit. M. J., December 8, 1951, No. 4744: 1365.*—(*E. A. Riley*)

LABORATORY STUDIES

Corticotropin, Tuberculin Reactions, and Antibodies.—The effect of corticotropin (ACTH) on inflammation produced by a specific immunologic system, tuberculin hypersensitivity, and by a nonspecific irritant, turpentine, was studied. Guinea pigs sensitized with heat-killed tubercle bacilli were used because high degrees of sensitivity could be developed and it was believed that these animals would withstand multiple procedures better than animals actively infected. Tuberculin complement-fixing antibodies were also measured on sera from most of the tuberculin-sensitive animals. In addition, hematologic and weight data were recorded to show the animal's response to corticotropin. Purified protein derivative (PPD) was employed intradermally to produce skin reactions on the backs of the animals. Following this, corticotropin was administered subcutaneously in the abdominal wall. As controls, some of the animals received physiologic saline solution instead of corticotropin. In a smaller group of normal animals, skin reactions were produced by injecting 0.1 cc. of oil of turpentine intradermally, and the effect of corticotropin and physiologic saline injections was studied. Results indicate that the administration of corticotropin to the sensitized guinea pigs caused a suppression of their skin reactivity to tuberculin. Similar animals treated with physiologic saline did not show this change. Normal animals treated with corticotropin showed suppression of inflammation, but not necrosis, produced by intradermal oil of turpentine. There was slight, but probably not significant, diminution of inflammation during saline administration. Tuberculin complement-fixing antibody titers were not altered by either corticotropin or physiologic saline administration. The corticotropin produced marked eosinopenia and lymphopenia in the guinea pigs. It would appear that the major role of the adrenal cortical hormones in the instances cited above lies in their ability to suppress tissue response to injury. Thus, the favorable effects of adrenal steroids on such diverse processes as tuberculin hypersensitivity and chemical insults can be explained.—*The effect of adrenocorticotropic hormone on inflammation due to tuberculin hypersensitivity and turpentine and on circulating antibody levels, C. K. Osgood & C. B. Favour, J. Exper. Med., November 1, 1951, 94: 415.*—(*J. S. Woolley*)

Slide Culture of Tubercle Bacilli.—A simple and speedy method for the culture of tubercle bacilli on slides is recommended especially for the detection of tubercle bacilli in bone marrow in cases of hematogenous tuberculosis.—*Zur Objekttraegerkultur des Tuberkulosebazillus, R. P. Koenigstein, P. S. Cheng, L. Koenigstein, & I. D. Suen, Wien. klin. Wchnschr., September 1, 1951, 63: 723.*—(*G. C. Leiner*)

Laryngeal Swab in Pulmonary Tuberculosis.—Comparisons were made between 967 cultured gastric lavage and laryngeal swab specimens taken from sanatorium patients being subjected routinely to gastric lavage. For each

lavage performed, triplicate swabs were taken; one on the day of lavage and one on each of a day before and after it, all being completed within a week. The swabs were treated with trisodium phosphate and cultured on liquid oleic-acid-albumin medium. Results indicated that under these conditions one swab was a somewhat superior specimen to one lavage; 3 consecutive swabs were almost twice as valuable in yielding positive cultures as one lavage. The procedure of swabbing is much easier on the patient and less time-consuming for the staff. It is of value at the chest clinic (Author's summary).—*The laryngeal swab specimen in the cultural diagnosis of pulmonary tuberculosis, A. R. Armstrong, Canad. M. A. J., December, 1951, 65: 575.—(E. A. Riley)*

Serology of Polysaccharides.—By means of the precipitation, complement fixation, and agglutination tests, the author compared the serologic activity of a number of polysaccharides from tubercle bacilli with both animal and human sera. The polysaccharides were: (*1*) a polyglucosan, containing no pentose or other sugar except glucose; (*2*) dextro-rotary sugar, sugars with a low dextro rotation; and (*3*) dextro-rotary material made by ethanolic precipitation of a watery extract of tubercle bacilli. Immune horse, rabbit, guinea pig, and human sera were used. All of the polysaccharides tested reacted with the same antibody in animal sera; however, none of the polysaccharides reacted with sera obtained from tuberculous patients.—*The serology of polysaccharides from the tubercle bacillus, C. N. Iland, J. Path. & Bact., October, 1951, 63: 735.—(H. J. Henderson)*

Pulmonary Function Test.—In 1946 Ornstein described a rebreathing technique for measuring pulmonary function. Since many patients had great difficulty in properly performing this pulmonary function test, it has been modified by decreasing the intensity of the exercise and by having the subject breathe a mixture of 15 per cent oxygen and 85 per cent nitrogen for two minutes before and during the exercise. The exercise consists of raising and lowering a fifteen-pound weight a distance of one foot twenty-three times in forty-six seconds. Upon completion of this exercise the subject rebreathes for twenty seconds into a 5-liter bag containing one liter of a mixture of 15 per cent oxygen and 85 per cent nitrogen. A femoral arterial blood sample is collected before the start of the test and starting at the seventeenth second of rebreathing. The oxygen and carbon dioxide partial pressures in the blood are compared with the corresponding partial pressures in the rebreathed gas. The differences of the pressures will indicate any lag in the diffusion of gases in the lung. The higher the partial pressure of oxygen in the rebreathed gas as compared with the oxygen pressure in the blood, the greater is the impairment of diffusion. Likewise, the higher the carbon dioxide partial pressure in the blood, the greater is the obstruction to gas diffusion. A group of 21 men with definite evidences of lung pathology were tested. The average partial pressure of carbon dioxide was 0.6 mm. of mercury higher in the blood than in the gas from the rebreathing bag. The average partial pressure of oxygen in the blood was 7.7 mm. of mercury less than that in the rebreathed gas. The degree of respiratory impairment in patients with pulmonary disease, as indicated by a comparison of oxygen partial pressures in the arterial blood and the rebreathed gas varied greatly. There were some patients who had normal results with this test of lung function. In these no dyspnea was present on effort, good motion of the diaphragm was noted on fluoroscopy, and good aeration was present on auscultation. On the other hand, those with evidence of poor diffusion as shown by this lung function test were frequently dyspneic at rest and on fluoroscopy showed virtually no motion of the diaphragm. A possible use of this test is suggested by the studies made before and after pneumonectomy. In 2 cases in which a noticeable impairment to normal diffusion was evident before pneumonectomy, there was an approach to normal after the operation. If this functional efficiency is maintained, the need for thoracoplasty to prevent the development of emphysema is obviated.—

A test for the measurement of pulmonary function, G. G. Ornstein, D. Meyers, & I. Eckman, Quart. Bull., Sea View Hosp., April, 1951, 12: 47.—(K. T. Bird)

Reflex Atelectasis.—The effects of mechanical, chemical, and pharmacologic stimuli applied directly to the lungs of rabbits were studied microscopically through a surgical opening in the chest wall. A moderate tonic contraction of the alveoli and of the air sacs was noted, but there was no complete airlessness nor complete loss of function. Irritation of the visceral pleura produced hyperemia and exudation into the alveolar spaces; these latter probably contributed to reduction of the respiratory function of the lung. From these studies it is concluded that the active or reflex contraction of the alveoli and of the alveolar sacs is insufficient to explain the pathogenesis of atelectasis. It is more likely that atelectasis is due to the contraction of a great number of bronchioli and of alveolar ducts, which compresses the surrounding parenchyma and causes centripetal traction.—*Contribución experimental al problema de las atelectasias reflejas por contracción pulmonar, F. J. Ontiveros, F. M. Bravo, & A. Bonnet, Rev. españ. de tuberc., July, 1951, No. 196: 411.—(L. Molnar)*

Mechanical Heart and Lung.—An improved oxygenator and extracorporeal circuit has been devised for use in dogs. The equipment consists of stainless steel screens in parallel in a distributing chamber and a clear plastic case. It was manufactured by the International Business Machine Corporation. Of 21 dogs used, 7 have survived after twenty to ninety-six minutes of perfusion and occlusion of the vena cava, and results seem to be improving.—*Recent advances in the development of a mechanical heart and lung apparatus, B. J. Miller, J. H. Gibbon, & M. H. Gibbon, Ann Surg., October, 1951, 134: 694.—(W. H. Oatway, Jr.)*

Elasticity of Rat Lung.—The elasticity of the isolated exsanguinated rat lung preparation has been studied by means of volume-time and volume-pressure curves obtained by inflation with subatmospheric extrapleural pressure. The volume-pressure curves and the retractile characteristics of these preparations were studied in relation to the rate of inflation and deflation measured in terms of mm. of water pressure per minute. The explanation is offered that the striking nonlinearity of volume-pressure curves arises from the postmortem collapse and obstruction of the bronchial tree. There appears to be a critical pressure which must be reached before significant inflation of the air spaces takes place. The volume-pressure curve above this critical pressure appears to approximate more closely the volume-pressure curve of the lung during life. The long-range extensibility and the characteristic *S*-shape of the corrected volume-pressure curve of the isolated rat lung arise chiefly from its rubber-like elastic tissue fibers. A generalization of the lung as a single elastomeric shell has been suggested and the application of statistical theory carried out. Theory and experiment are in good agreement to over 200 per cent inflation (Authors' summary).—*Measurement of the elasticity of the isolated rat lung, R. W. Lawton & D. Joslin, Am. J. Physiol., October 1, 1951, 167: 111.—(G. C. Leiner)*

Ciliary Action of Trachea.—Negative pressure is produced in the trachea of freshly killed hens by ciliary action when a mass of mucus, large enough to occlude the lumen, is placed in the lower end and the lower end then stoppered. The principle is similar to that involved in a piston-cylinder action. This effect of ciliary action upon occluding masses of mucus within the trachea is cumulative, i.e., each added piston of mucus within a single tubular system, acted upon by ciliary action, increases the total pressure (Author's summary).—*Production of negative pressure in the trachea of the hen by ciliary action, A. C. Hilding, Am. J. Physiol., October 1, 1951, 167: 108.—(G. C. Leiner)*

Respiration in Drowning.—Both anesthetized and unanesthetized rats drowned by submersion show four respiratory phases: (*1*) a short period of apnea; (*2*) a period of dyspnea; (*3*) a long period of anoxic apnea; and (*4*) a

short series of respiratory movements of approximately the amplitude of normal respirations or slightly greater, sometimes inspiratory, sometimes expiratory, and sometimes mixed but unaccompanied by the neck and facial movements seen in phase (*2*). Rats submerged in water at 1°C. reach the beginning of phase (*4*) in approximately 155 seconds, while in water at 40° the time required for the same events is only 95 seconds. The time of survival increases again as the temperature is raised to 55° and then decreases once more at higher temperatures. Animals in which the trachea was clamped while immersed with face above water gave the same response. Epinephrine and ethyl alcohol given orally decreases survival time at low temperatures (Author's summary). —*Respiratory movements of rat during drowning and influence of water temperature upon survival after submersion, S. W. Gray, Am. J. Physiol., October 1, 1951, 167: 95.—(G. C. Leiner)*

Oxygen Tents.—Using rabbits as subjects, experiments were carried out to determine the concentration of oxygen reached under varying conditions in children's oxygen tents. Without preliminary flushing, a flow of one liter of oxygen a minute gave a concentration of 70 per cent oxygen after three hours. A flow of 3 liters a minute reached 75 per cent oxygen in one hour and 84 per cent after three hours. A flow of 4 liters a minute gave a concentration of 87 per cent oxygen at one hour. At a flow of one liter a minute, preliminary flushing resulted in a permanent increase from 70 to 80 per cent. Contamination from room air by keeping the lid of the tent open approximately one inch almost halved the oxygen concentration at the flow rate of 2 liters a minute.—*The concentration of oxygen reached in oxygen tents, C. R. S. Jackson, Brit. M. J., November 10, 1951, No. 4740: 1129.—(E. A. Riley)*

PUBLIC HEALTH AND EPIDEMIOLOGY

Tuberculous Epidemic.—A small epidemic of 12 cases of primary tuberculosis occurred in a children's school. The primary source of infection was thought to be a teacher with active pulmonary tuberculosis. The classes predominantly affected were those with which the teacher had come into closest contact. The histories suggest that the incubation period for primary tuberculosis lies between forty and sixty-two days.—*An outbreak of respiratory tuberculosis in a school, R. T. Bevan, P. T. Bray, & J. F. Hanly, Brit. M. J., October 6, 1951, No. 4735: 828.—(E. A. Riley)*

Tuberculin Conversion.—From 1937 until 1943, PPD was used and, since 1943, OT in doses of 0.01 mg. and 1 mg. was employed for skin testing 3,806 infants and pre-school children in Peking. The over-all annual tuberculin conversion rate was 21.1 per cent, being lowest in children less than two years of age and steadily increasing, reaching a peak in the age group of seventeen to eighteen years. There was no significant sex difference below the age of twelve, but above the age of fourteen the conversion rate was higher for boys. Among 803 tuberculin converters, 758 were examined roentgenographically immediately after the positive reaction was discovered and 82 (10.8 per cent) were found to have pulmonary lesions. The attack rate was highest for the age group one to two years (20 per cent), lowest in the age group ten to eleven years (6 per cent), and then rose again. Among the 82 cases having significant pulmonary lesions, 61 per cent were classified as hilar adenitis, 24 per cent as progressive pulmonary tuberculosis, 11 per cent as pleuritis, and 3 per cent as benign lobar consolidation. The frequency of hilar adenitis decreased the older the patient was at the time of infection, being 91 per cent for persons infected who were less than four years of age and only 11 per cent in the age group fifteen to twenty years. On the other hand, the relative frequency of progressive tuberculosis increased with age, being 66 per cent in the age group fifteen to twenty years. No cases of miliary tuberculosis or meningitis were seen in this series since the clinic cares only for well infants or those mildly ill.—*The study of annual tuberculin conversion in Peking, J-S Ts'ai, Chinese M. J., September–October, 1951, 69: 392.—(L. Hyde)*

BCG Vaccination.—At the H. M. Naval Base in Singapore, 1809 tuberculin-negative

Asiatic children were vaccinated with BCG. No adverse reactions were noted; the conversion rate was only 52.4 per cent. The following reasons were thought responsible for this low conversion rate: (*1*) incomplete suspension of the dried vaccine, (*2*) cruciate scratches of the skin which were not deep enough, (*3*) improper drying of the vaccine on the skin, and (*4*) insufficient rubbing of the vaccine into the skin with the needle edge. The faults arose from inexperience and because too many children were vaccinated at one time.—*Mass BCG vaccination in a British colony, A. W. W. Robinson, Brit. M. J., October 13, 1951, No. 4736: 884.—(E. A. Riley)*

Radiology of Silicosis.—Early silicotic changes are not sufficiently characteristic for a roentgenologic differentiation from other pulmonary conditions or for the recognition of the type of dust responsible for the silicosis. The shadows cast by silicosis in the nodular stage are subpleural in the lateral parts of the upper and middle zones. This characteristic pattern, persistent even in the late stages of the disease, permits the differentiation of silicosis from nodular densities of other origin. Radiologic differences in the silicotic changes caused by inhaling various types of dust are determined by the silica content of the inhaled dust, by the intensity and duration of the exposure, and by the presence of other types of dust with the silica. The purest silicosis occurs in stone masons, stone cutters, and stone quarry workers, all handling sandstone with a silica content of 80 to 90 per cent. This type is characterized by diffuse mottling with dense, well-defined nodules, sometimes calcified, recognizable even late when coalescence of the nodules dominates the picture. Similar, but less pronounced, lesions are found in granite and basalt workers who are exposed to a dust with a lower silica content. Typical egg-shell calcification of the hilar lymph nodes occurs in sandstone silicosis, in slate quarry miners and in grinders, and less frequently in other types of silicosis. A sandstone type of silicosis is observed in knife grinders who are exposed to dangerous quantities of wet silica dust. Association with tuberculosis is particularly frequent in this type of silicosis and in that occurring in workers in the scouring powder industry. The inhalation of mixed dust in Ruhr miners causes a picture characterized by less sharply delimited nodules in which histologically abundant inflammatory reaction is noted. The nodular character of the lesions is lost earlier in this type of silicosis than in that caused by pure silica dust, and the large conglomerate shadows are observed at earlier stages of the disease. The silicosis of the Siegerländer iron ore miners is characterized by a fine mottling in both lung fields, thought to be produced by the inhalation of iron dust. Silicosis in pottery and ceramics workers is due to a dust of low silica content (15 to 20 per cent) and develops only after years of exposure; the densities are softer than in the previous types, and the conglomerate shadows are less sharply delimited. Clinically, this type is accompanied by chronic bronchitis and asthma. In the refractory brick industry, different materials with varying silica content are used and the roentgenologic picture of the ensuing silicosis varies also. Tomography of silicotic lungs may reveal cavities, the shape and characteristics of enlarged hilar lymph nodes, the localization of densities, and may reveal associated tuberculosis.—*Über die Röntgencharakteristik der Silicosen nach Staubberufen, R. Haubrich, Fortschr. Röntgenstrahl., April, 1951, 74: 385.—(L. Molnar)*

Bronchogenic Carcinoma in Asbestosis.—Bronchogenic carcinoma occurs more frequently in patients with asbestosis than in the general population. In a 40-year-old white man, in whom the clinical diagnosis had been metastatic carcinoma to lung and bone, primary site unknown, the autopsy revealed: (*1*) an aplastic carcinoma of the lung with the possibility of multicentric origin, with metastases to kidney, brain, and liver; and (2) pulmonary asbestosis. It is believed that the silicate in asbestos is carcinogenic.—*Asbestosis associated with bronchogenic carcinoma, R. Stoll, R. Bass, & A. A. Angrist, A. M. A. Arch. Int. Med., December, 1951, 88: 831.—(G. C. Leiner)*

THE AMERICAN REVIEW OF TUBERCULOSIS

OFFICIAL JOURNAL OF THE AMERICAN TRUDEAU SOCIETY
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VOLUME 66
JULY–DECEMBER, 1952

PUBLISHED MONTHLY
AT MOUNT ROYAL AND GUILFORD AVENUES, BALTIMORE 2, MD.
BY THE NATIONAL TUBERCULOSIS ASSOCIATION

LIST OF JOURNALS ABSTRACTED

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THE AMERICAN REVIEW OF TUBERCULOSIS

ABSTRACTS

Edited by LAWRENCE B. HOBSON

VOLUME 66 JULY, 1952 ABST. NO. 1

CLINICAL STUDIES, TUBERCULOSIS

Tuberculous Empyema.—Among 44 cases of chronic tuberculous empyema treated with pleurectomy or pleuropneumonectomy, only 4 were spontaneous empyemas; the remaining 40 empyemas developed as a complication of medical or surgical collapse therapy. Of the 28 instances in which empyema had complicated intrapleural pneumothorax, 14 had followed lysis of adhesions, 9 had occurred in the presence of an unrecognized bronchial stenosis, and 5 had developed during the course of an ineffective and dangerous pneumothorax for a giant cavity. There were 9 empyemas complicating extrapleural pneumothorax, and 3 developed under thoracoplasty in the presence of a bronchial stenosis. Thus, tuberculous empyema is more often a complication of treatment than of the disease itself, and in the majority of instances it represents an error of indication, of technique, or of diagnosis. Pleuropneumonectomy was performed in 25 of the 35 patients with intrapleural empyema. Of these, 17 made an uneventful and complete recovery, 3 recovered after complications, namely, recurrence of empyema, 3 died (1 of acute contralateral spread of the disease, 1 of hemorrhage from an ulcerated pulmonary vein, and 1 following bronchial fistula), and 2 are incompletely cured. In 7 of the foregoing cases, thoracoplasty was also performed, but this operation offered an additional hazard because of the contaminated field rather than reducing the risk of recurrent empyema. Anatomic examination of the specimens from this group of patients revealed that in 10 cases the radical operation was justified, in 6 a superior lobectomy would have sufficed, and in 2 a pleurectomy alone might have resulted in re-expansion of uninvolved lung. There were 10 patients subjected to pleurectomy alone or with superior lobectomy, among which there were 8 clinical cures, one unfavorable incomplete result, and one fatality. Thus, of the 35 operations for intrapleural empyema there were 80 per cent clinical cures with 65 per cent uncomplicated. There were 9 patients with extrapleural empyema who were treated by excision of the pocket and thoracoplasty, pleuropneumonectomy, or pleurolobectomy. Of this group, there were 4 cures of which 2 were without complications, 2 deaths, 2 incomplete results, and one contralateral spread which has run a benign course. The authors point out the greater gravity of extrapleural empyema because of the absence of pleural barrier to mediastinal and chest wall extension.—*Traitement des pyothorax tuberculeux chroniques par les opérations d'exérèse pleurale et pulmonaire (pleuro-pneumonectomies—décortications—opérations combinées), J. Mathey, G. Oustrières, & R. Bical, Poumon, November, 1951, 7: 503.*—(*F. S. Lansdown*)

Liver Biopsy in Hematogenous Tuberculosis.—In a case of tuberculous cervical lymphadenitis, elevation of temperature suggested the possibility of hematogenous dissemination. This opinion was confirmed by the demonstration of a tubercle in a punch biopsy of the liver (Authors' summary).—*Punch biopsy of liver in detection of hematogenous tuberculosis, A. G. Cohen & B. Giges, J.A.M.A., August 11, 1951, 146: 1416.*—(*H. Abeles*)

Posture in Spread of Tuberculosis.—A total of 157 patients with unilateral cavernous disease and a bronchogenic contralateral spread were compared with 93 cases of unilateral cavernous disease and a clear contralateral lung. The distribution of spread follows: right lung—"axillary subsegments" (lateral

branches of the anterior and posterior divisions of the upper lobe bronchi), 65; remainder of upper lobe, 43; lingula, none; middle lobe, 3; lower lobe, 15; left lung—"axillary subsegments," 66; remainder of upper lobe, 26; lingula, 46; middle lobe, none; and lower lobe, 9. It is seen that the "axillary subsegments" and lingula were the areas principally affected. The relation between sleeping posture and contralateral spread was investigated. Among cases which spread, 31 patients slept on the side of the cavernous disease and 58 on the other side. Among cases without spread, 42 slept on the homolateral side and 16 on the other side. These figures are statistically significant. Experiments with iodized oil indicated that the oil spreads from one lung to the "axillary subsegments" and lingula of the other when the patient lies with the oil-containing side uppermost. It is therefore recommended that patients with unilateral tuberculosis should be made to sleep on the affected side.—*The importance of sleeping posture in the spread of pulmonary tuberculosis, W. H. Helm, Thorax, December, 1951, 6: 417.—(A. G. Cohen)*

Bronchial Tuberculosis in Children.—Five cases illustrate the importance of bronchial involvement in the pathogenesis of parenchymal consolidation and in the course of primary tuberculosis in children. It is frequently overlooked. Bronchoscopic treatment should be done, not only in patients presenting evidence of wheezing, atelectasis, or obstructive emphysema, but in every patient with childhood primary pulmonary tuberculosis whose prognosis is not considered satisfactory. Bronchoscopic examination in children is a relatively easy and safe procedure. It may prevent late complications, such as bronchiectasis, following primary pulmonary tuberculosis.—*Importance of bronchial involvement in primary tuberculosis of childhood, H. I. Laff, A. Hurst, & A. Robinson, J.A.M.A., June 30, 1951, 146: 778.—(H. Abeles)*

Thoracoplasty in Older Patients.—The proportion of patients more than 40 years of age selected for surgical collapse therapy has been steadily increasing; 11 per cent in 1946; 18 per cent in 1948; 20 per cent in 1950. In 34 per cent of all these patients, tuberculosis appeared clinically and roentgenologically of recent date; another 34 per cent had reactivation of their disease after rest cure or a contralateral spread after collapse therapy; 16.5 per cent were discovered on routine examination, and roentgenologically their lesions appeared old; 15.5 per cent had relapse *in situ* after reexpansion of an effective pneumothorax. Between 1948 and 1950, 101 patients more than 40 years of age were operated upon; of these, 70 were between 40 and 50 years of age, 29 between 50 and 60, 2 were more than 60 years old. In 51 of these patients, the clinical onset of their disease dated several years earlier. In the remaining 50 patients, the onset of symptoms was recent. The roentgenologic aspect suggested recent disease in 43 and an old process in 7 patients. The results of the 101 surgical procedures was as follows: poor in 2 patients, favorable in 17, "locally complete" in 74. There were 8 deaths. In 7 patients a cavernostomy was added. Different types of pneumonolysis were performed in 23 patients, with 3 deaths.—*Traitement chirurgical de la tuberculose pulmonaire chez les sujets de plus de 40 ans, Joly & Tulou, Rev. de la tubere., 1951, 15: 600.—(V. Leites)*

Thoracoplasty for Tuberculosis.—The usual criteria were used in selecting 50 patients treated by thoracoplasty. In the preoperative preparation, emphasis was placed upon reduction of the size of the cavity by postural methods and the use of antibictics. Streptomycin, 1 gm., intramuscularly and *p*-aminosalicylic acid, 12 gm., orally were given daily for three to four months. Postural methods require determination of the position of the cavity; positioning to make the cavity most dependent is then carried out. In most cases, the supine position is used. For bilateral upper lobe disease, blocks 8 to 10 inches high are used at the foot of the bed. For cavitation in the apical segment of either upper lobe, the patient is turned to the affected side at

an angle of approximately 45 degrees and the foot of the bed is raised on 12-inch blocks. For cavitation in the axillary segments, the position is similar to the one above, but the patient lies on the affected side. For cavitation in the apical segment of the lower lobe, the patient is tilted to the affected side by approximately 30 degrees. The prone position is used for anterior cavities. Positioning usually is continued for three to four months. In many cases, the reduction in size of the cavities was very dramatic. However, if thoracoplasty was not done, the cavities sooner or later enlarged. Postural therapy is also of value in preparing patients for resection.—*An account of treatment of tuberculous cavities by thoracoplasty with special reference to the use of postural reduction as a pre-operative measure, M. D. Deshmukh & E. H. Williams, Tubercle, November, 1951, 32: 240.—(A. G. Cohen)*

Pneumonectomy and Thoracoplasty.—In 100 cases of resection for pulmonary tuberculosis, there were 6 deaths, 8 empyemas, 7 bronchopleural fistulas, and 87 remained sputum negative. It was thought that the performance of a thoracoplasty immediately after the pneumonectomy might obliterate the hemithorax and thus cut down the incidence of bronchopleural fistula and empyema. Previous experience showed that thoracoplasty performed some time after pneumonectomy failed to accomplish this objective. The combined operation has now been performed in one stage on 15 patients. The operation was tolerated well; no patient developed empyema or bronchopleural fistula. The duration of follow-up is too short for any final assessment.—*Pneumonectomy with immediate thoracoplasty in the treatment of pulmonary tuberculosis, G. Cruickshank & E. Papamichael, Thorax, December, 1951, 6: 369.—(A. G. Cohen)*

Segmental Resection.—Fifty segmental resections, either alone or in conjunction with lobectomy, were performed in 48 patients. The indication for surgery was pulmonary tuberculosis in 25 operations, bronchiectasis in 17, chronic lung abscess in 2 and, in one each, the following: terato-dermoid cyst, suppuration secondary to a foreign body, ruptured emphysematous bleb, and pulmonary arteriovenous aneurysm. In 2 patients with bronchiectasis, bilateral segmental resections were performed. There was one postoperative death. The development of bronchopleural fistulas with empyema was encountered in 5 cases; miscellaneous complications occurred in another 4 cases.—*Segmental resection for pulmonary diseases, W. C. Conklin & H. Westerberg, J.A.M.A., June 16, 1951, 146: 633.—(H. Abeles)*

Resection in Children.—Seven lobectomies and 6 pneumonectomies were done on 12 children. All but one patient were less than fifteen years of age. The results to date are favorable. The pneumonectomies were performed for extensive unilateral disease. Of the lobectomies, 3 were performed when other methods had failed, 3 as a method of choice, and one as an emergency procedure to prevent rupture of a cavity under artificial pneumothorax. All but 2 received a period of sanatorium treatment before resection; 9 received streptomycin. Standard operative technique was used, and obliteration of the dead space has not been a problem. Bed rest is an essential part of postoperative treatment.—*Pulmonary resection for tuberculosis in children, C. A. Ross, Thorax, December, 1951, 6: 375.—(A. G. Cohen)*

Pneumonectomy in Children.—Pulmonary resection in tuberculous adults is universally accepted in a variety of instances. Four girls between eight and thirteen years of age had pneumonectomies performed because of pulmonary retraction with atelectasis, pneumonitis, and secondary bronchiectasis. The postoperative course was uncomplicated in each instance, and each patient had an early recovery. All gastric washings became negative soon after pneumonectomy and remained so.—*Pneumonectomy in the treatment of tuberculosis in children, S. M. Botelho, A. Chapchap,*

H. L. G. Pereira, & O. V. Cordeiro, Dis. of Chest, December, 1951, 20: 642.—(E. A. Rouff)

Atelectasis in Pneumothorax.—In 4 cases of pneumothorax, the healthy lower lobe became atelectatic, in one case after induction and in 3 after thoracoscopy. In each case, bronchoscopy was normal. Removal of large amounts of air resulted in re-expansion of the lobe in one. In the other 3, intrapleural readings returned promptly to the initial level, indicating the presence of a bronchopleural fistula. Thoracoscopy in 2 of these 3 cases showed an emphysematous bleb. It was decided to abandon the pneumothoraces. A small tube was introduced into the pleural space and continuous negative pressure was maintained. The lobes eventually re-expanded. —*Atelectasis of the healthy lobe in pneumothorax therapy, E. V. Hess, Tubercle, November, 1951, 32: 237.—(A. G. Cohen)*

Streptokinase and Streptodornase.—Six post-pneumonectomy cases and 4 cases of extrapleural pneumothorax were treated with streptokinase and streptodornase. In all pneumonectomy cases, the hemithorax was filled with coagulated blood. In the 4 cases of extrapleural pneumothorax, blood clots and fibrin deposits prevented refills and the maintenance of the extrapleural space. One injection of streptokinase was sufficient in all cases to liquefy the contents of the pleural or extrapleural cavity and to permit its evacuation. From two to four aspirations were necessary to withdraw all the exudate. The febrile reactions were never severe and exceeded 38° in only 2 patients.—*La streptokinase en chirurgie thoracique les hemithorax après pneumonectomie totale et après crèation d'un pneumothorax extrapleural, A. Duprez & A. Dumont, Presse méd., November 24, 1951, 59: 1573.—(V. Leites)*

Post-Resection Oleothorax.—Thoracoplasty is probably the best method for collapsing the remaining pleural space following pneumonectomy, but in some cases a less traumatic means should be considered. The authors utilized olive oil containing penicillin (mineral oil would serve as well) to establish oleothorax in four to six weeks following pneumonectomy because empyema and bronchopleural fistula will have developed in most instances within that period. This procedure was utilized in 20 selected cases; empyema developed in 2 cases and was associated in one with bronchopleural fistula and in the other with pleurocutaneous fistula.—*Oleothorax following pulmonary resection, N. C. Andrews, D. A. Morton, G. M. Curtis, & K. P. Klassen, Dis. of Chest, November, 1951, 20: 501.—(E. A. Rouff)*

Artefacts Simulating Tuberculosis.—One type of roentgenogram artefact, an opaque, white shadow, may simulate a minimal tuberculous infiltrate. A buckling or kinking of the film produces a mechanical stretching of the film emulsion, which alters the film's local sensitivity along the line of its bending. Such "pressure marks" may be strongly suspected when the shadow in question shows a higher degree of whiteness than any other portion of the chest roentgenogram or when this whiteness diminishes imperceptibly towards its periphery. An acute exudative tuberculous lesion of a confluent lobular nature has, at times, been noted to present a very similar appearance. Appearance alone is an unreliable guide in the differentiation of these shadows from true pulmonary infiltrations. The observer should suspect "pressure mark" artefacts when any of the following conditions are noted: (*1*) associated artefacts which are more readily identified by characteristic appearance or by location outside of the lung regions; (*2*) a generalized increase in film sensitivity as evidenced by an abnormally dark roentgenogram. The shadow which appears crescent-shaped will be easily recognized as a typical "pressure mark," especially if accompanied by a sharp black "crinkle" line or by a linear white mark bisecting its concavity. The observer's suspicions are confirmed when immediate roentgenographic re-examination fails to disclose the shadow previously noted.—*Artefacts simulating minimal pulmonary tuberculosis, I. J.*

Kane, Am. J. Roentgenol., November, 1951, 66: 803.—(T. H. Noehren)

CLINICAL STUDIES, NONTUBERCULOUS DISEASES

Bacteroides Infections.—The *Bacteroides* comprise a large group of anaerobic nonsporulating bacilli which are gram-negative and are either motile or nonmotile. The pathogenicity of these organisms had been well demonstrated in experimental animals and until recently *Bacteroides* septicemia in man was usually fatal. It is believed now, however, that *Bacteroides* infections occur much more frequently and are less fatal than would be concluded from the literature. Since the *Bacteroides* are anaerobes, they are overlooked unless specimens are cultured anaerobically. A total of 35 cases of *Bacteroides* infection were observed at the John Gaston Hospital in Memphis during five years. In 6 cases the infections originated in the respiratory system. All of these patients were critically ill with "spiking" fever and were hospitalized for twelve hours to fifty-nine days. All were Negroes; 4 were men and 2 were women. In 2 instances, *Bact. funduliformis* was isolated from the blood. In one case in which the portal of entry was the respiratory tract, septicemia developed and death resulted from multiple lung abscesses despite sulfathiazole and penicillin. While the clinical course in this prolonged case was steadily retrogressive, symptoms were surprisingly mild. *Bact. funduliformis* was isolated in pure culture from the blood on the eleventh day of hospitalization, and cultures of the blood, sputum, and lungs at necropsy also yielded these organisms in pure culture. A second patient displayed the most fulminating infection in the entire series. The course was only three and one-half days, and necropsy revealed massive confluent bronchopneumonia from which *Bact. funduliformis* was obtained in pure culture. It is noteworthy that this was the only patient who appeared poorly nourished and poorly developed on admission; he was 64 years of age, and was the only one who "looked" critically ill. In another case empyema followed pneumonia, and empyemic material with a characteristic foul odor yielded pure *Bact. funduliformis* on culture. *In vitro* sensitivity studies were carried out in another similar case of *Bacteroides* empyema and disclosed that aureomycin was an effective therapeutic agent. The usual pathologic finding in this group of cases was localized suppuration which at times gave rise to septicemia or bacteremia with subsequent widespread involvement.—*Bacteroides infections, L. V. McVay, Jr., & D. H. Sprunt, Ann. Int. Med., January, 1952, 36: 56.—(T. H. Noehren)*

Management of Lung Abscess.—Infection, bronchial obstruction with resulting atelectasis, and impairment of the arterial circulation to the segment involved are necessary for the formation of a lung abscess. Predisposing conditions are those resulting in loss of protective pulmonary reflexes and favoring aspiration, local situations in the mouth or upper respiratory tract favoring infection, acute pulmonary pathology, and certain miscellaneous conditions, including diabetes, alcoholism, and some forms of heart disease. Cases should not be classified as putrid or nonputrid, since the quality of the sputum reflects only the current degree of obstruction. Tubercle bacilli must be sought especially in upper lobe cavities, which formed 65 per cent of a group of 45 proved cases of lung abscess. The cardinal principle in therapy is drainage; without it, other measures fail. Penicillin in large doses should be employed in all cases, but its chief usefulness is in aborting cavitation during the "pre-abscess" stage. All hospitalized patients after general anesthesia, convulsive states, or coma should be given penicillin for at least forty-eight hours or until they have been afebrile for twenty-four hours. The usefulness of bronchoscopy in the treatment of lung abscess is generally accepted but its prophylactic value is also great. Bronchoscopy will often prevent abscess formation in the presence of atelectasis or of so-called "unresolved pneumonia." Occa-

sionally, unsuspected foreign bodies can be removed and malignancy can be recognized earlier. If an abscess is present, the bronchoscopist may establish drainage by aspiration of debris and by removal of granulation tissue. Repeated bronchoscopies are indicated if they aid drainage and further roentgenographic improvement. Surgery is better delayed if the disease improves steadily under medical management. If roentgenograms show no continued regression, surgical intervention is indicated. After approximately six weeks, even an apparently stationary disease process leaves permanent changes in the involved lobe with scarring, fibrous retraction, bronchiectasis, and consequent reduction in its efficiency. In such situations, more harm is done by too late than by too early operation. The mortality rate of lung abscesses during the past decade was 4.5 per cent in three previous decades.—*The management of lung abscess, with special reference to the place of antibiotics in therapy, E. H. Drake & F. M. Sones, Jr., Ann. Int. Med., December, 1951, 35: 1218.*—(*T. H. Noehren*)

Pulmonary Spirochetosis.—A 38-year-old Oriental had been ill a year with bouts of fever, productive cough, hemoptysis, loss in weight, and anorexia. Physical and roentgenologic examinations suggested a diagnosis of far advanced pulmonary tuberculosis. All laboratory investigations, including animal inoculation, failed to reveal acid-fast bacilli. The sputum contained many *Spirochaeta schaudinni* and was practically free of other organisms, with the exception of numerous fusiform bacilli and *Staphylococci*. Inoculation into monkeys resulted in active pulmonary lesions from which spirochetes were recovered. The patient died, and autopsy revealed extensive cavitation and parenchymal necrosis; proliferative lesions were not observed. Early diagnosis and treatment with arsenicals will cure the acute disease in practically all cases and arrest the moderately advanced in many. —*Pulmonary spirochetosis, R. W. Mendelson, J.A.M.A., June 23, 1951, 146: 727.*—(*H. Abeles*)

Pulmonary Cysticercosis.—A case of pulmonary cysticercosis which was discovered roentgenologically is reported. Numerous egg-shell-like calcifications were found on the chest film of a patient who recalled having had a tape-worm infection sixteen years earlier. At that time she had pulmonary symptoms accompanied by generalized muscle pain, consistent with worm infection. Similar calcifications were noted also in the liver, and this circumstance was helpful in arriving at the correct diagnosis. Pulmonary calcifications of the same type were noted in 2 other patients, but the absence of extrapulmonary localizations did not permit a definite diagnosis.—*Zystizerkosis der Lungen und Leber, G. Zur, Fortschr. Röntgenstrahl., August, 1951, 75: 186.*—(*L. Molnar*)

Localized Amyloid Deposition.—Local amyloid tumefaction of the trachea and major bronchi occurred in a 43-year-old white house painter who had progressive wheezing and shortness of breath for five years and later a cough productive of one-half cupful of thick white sputum daily. He gradually developed dyspnea, even at rest, and was first admitted to the hospital for pneumonia. This pneumonia recurred several times and was later complicated by hemoptysis. Chest roentgenograms eventually revealed a large area of irregular density extending from the left hilar region into the left middle and lower lung fields and involving the base of the left lower lobe as well as the lower portion of the left upper lobe from hilum to lingula. Bronchoscopy disclosed projecting masses extending irregularly from the subglottic area to the carina, which was considerably broadened, and further into both main bronchi. The masses varied from pea-sized, globular projections to broad, flat elevations. They were covered by intact mucous membrane and were so firm and hard that biopsy was difficult. After each of 12 continuing bronchoscopic removals there was subjective and objective improvement. The patient was as dyspneic as before, but the wheeze was less prominent. In the literature there are 13

other possible cases of localized amyloidosis in the lower respiratory tract. The youngest patient was 30 years of age; men predominated 11 to 3. The duration of symptoms varied from two months to forty years. The signs and symptoms of the tracheal and bronchial involvement demonstrated the amount of obstruction produced. Various degrees of dyspnea, cough, and wheezing were encountered with superimposition at times of acute recurrent pneumonia or chronic bronchiectasis. The absence of amyloid elsewhere in the body was confirmed by autopsy in 11 cases. The remaining 3 patients were alive at the time of publication, without clinical or laboratory evidence of generalized amyloidosis. Diagnosis is almost completely dependent upon the study of biopsy material. —*Localized amyloid deposition in the lower respiratory tract, A. Schottenfeld, L. M. Arnold, J. G. Gruhn, & A. D. Etess, Am. J. Med., December, 1951, 11: 770.*—(*T. H. Noehren*)

Emphysema.—To determine the extent to which ventilatory insufficiency in patients with emphysema can be judged by radiologic appearances, 52 cases were studied. All had cough and dyspnea upon exertion. Each had some or all of the classical physical signs of emphysema. There were 2 clinical groups: "severe," characterized by dyspnea at rest; and "moderate," with dyspnea upon exertion. The results of spirometric studies paralleled the clinical findings unless the patients had asthma at the time of the test. The total lung volume exceeded the normal value in the "moderate," but was closer to normal in the "severe." The vital capacity, complemental air, and reserve air were subnormal in the "moderate" and more so in the "severe." The functional residual air and residual air were increased in the "moderate" and more so in the "severe." Radiologic changes were considered under a number of headings. Increased radiolucency cannot be measured quantitatively and varies with the degree of penetration. Fibrosis diminishes translucency, and both polycythemia and congestive failure may mask it. Increased translucency and increase in the retrocardiac area on lateral films were more constant findings than increased translucency in the postero-anterior views. Increased translucency was present in all cases of asthmatic origin but not in all others. Regarding the heart shadow, radiologic cor pulmonale was not an index of the severity or etiology of emphysematous changes. On the other hand, enlargement of the pulmonary conus was good evidence of emphysema if no other cause was present. Flattening of the diaphragms was constant in emphysema but the degree of flattening could not be correlated with severity. Likewise, the height of the diaphragms was no indication of severity. In asthmatics, there was no motion of the diaphragms during a paroxysm but motion was otherwise normal. With emphysema from other causes, in "severe" cases there was gross restriction of motion, less so in "moderate" cases. Flattening, depression, and reduced excursion of the diaphragm were regarded as good radiologic evidences of emphysema. In the absence of asthma, restricted motion is an indication of severity and suggests a nonasthmatic etiology. In two-thirds of the cases, downward motion of the hili was noted on inspiration. This was not seen normally. The presence of bullae or cysts was not an indication of severity. Kyphosis and apical rib crowding were seen in only one asthmatic but in two-thirds of the "severe" and one-half of the "moderate" nonasthmatic cases. Radiologic chest volume was increased. "High" transverse diameter of the chest tends to develop in women rather than men and points to an asthmatic origin. Calcification of the costal cartilages is not a special sign of emphysema.—*The correlation between the radiological appearances and the clinical and spirometric state in emphysema, A. G. W. Whitfield, O. E. Smith, D. G. B. Richards, J. A. H. Waterhouse, & W. Marnott, Quart. J. Med., July, 1951, 20: 247.*—(*A. G. Cohen*)

Löffler's Syndrome in Twins.—A two-year-old white boy, one of twins, was hospitalized because of burns. In the course of routine

examinations a marked eosinophilia and pulmonary infiltrations were found. The infiltrations cleared within six weeks but they reappeared three months later. When his twin sister was examined, a moderate but persistent eosinophilia was also found. No causative factor for the eosinophilia was elicited. Her chest roentgenogram showed slight, bilateral infiltrations which cleared over a period of several weeks. Löffler's syndrome was diagnosed in both cases.—*Löffler's syndrome: Report of cases in twins, F. R. Shechter & M. Graub, J.A.M.A., August 11, 1951, **146:** 1420.—(H. Abeles)*

Intravenous Corticotropin for Asthma.—The use of intravenous corticotropin (ACTH) offers an effective means for treating severe bronchial asthma. The total dose is one-fifth to one-eight of that required when ACTH is given intramuscularly. This route of administration is particularly effective when the patient demonstrates resistance to intramuscular ACTH or eosinophile escape. Antibiotics should be administered concomitantly, particularly to those patients with bronchitic manifestations, to combat the possible depression of resistance to infection produced by ACTH. Of 10 patients presented, 7 obtained excellent remissions; the remainder only partial relief. There was no complete therapeutic failure. The total dose ranged between 10 mg. and 210 mg. given over a period of one to nine days.—*Intravenous ACTH therapy in the treatment of bronchial asthma, M. S. Segal & J. A. Herschfus, Dis. of Chest, December, 1951, **20:** 575.—(E. A. Rouff)*

Cortisone for Asthma.—Twelve patients with severe bronchial asthma were treated with cortisone orally. An average daily dosage of 150 to 200 mg. divided into 25 or 50 mg. doses at four- to eight-hour intervals produced an effect comparable to that obtained with an equivalent amount of the saline suspension of cortisone administered intramuscularly. A good therapeutic response occurred in 9 patients. Symptomatic relapse was noticed in all cases within a few days after cessation of treatment with cortisone.—*Effect of cortisone administered orally in bronchial asthma, S. Friedlaender & A. S. Friedlaender, J.A.M.A., August 11, 1951, **146:** 1381.—(H. Abeles)*

Bronchial Adenoma.—Of 40 bronchial adenomas, 36 were carcinoids and 4 were cylindromas. Diagnosis was usually made by physical and roentgenologic signs of bronchial obstruction and confirmed by bronchoscopy and biopsy studies. This series demonstrated that the most efficacious therapy must be determined in each case. Lobar or pulmonary resection should be done only if it is impossible by local measures to relieve compression due to extrabronchial tumor or if there are irreversible changes in the lung. In other instances bronchoscopic removal or bronchotomy is the conservative approach. These tumors cannot be considered truly malignant or wholly benign; they are "borderline" tumors. There were no metastases in this series but a few true liver metastases have been reported. Histologically malignant obstructive bronchial tumors have also been shown to be clinically benign by freedom from recurrence for as long as thirty-five years after bronchoscopic removal of the tumor.—*The role of bronchoscopy in the diagnosis and treatment of bronchial adenoma, C. L. Jackson & C. M. Norris, Dis. of Chest, October, 1951, **20:** 353.—(E. A. Rouff)*

Hodgkin's Granuloma.—The patient with Hodgkin's granuloma and pericardial effusion previously reported (Am. Heart J., 1950, *40:* 624) died and was autopsied. The anti-mortem diagnoses were: Hodgkin's granuloma with involvement of lymph nodes, pericardium, lungs, and pleura with earlier pericardial effusion. The pathological diagnoses were: (*1*) Cardiovascular system: Hodgkin's disease of the pericardium, epicardium, and myocardium; ventricular hypertrophy and dilatation; adhesive pericarditis. (*2*) Respiratory system: Hodgkin's disease of the lungs, the pleura, the diaphragm, and the mediastinum; bilateral hydrothorax; adhesive pleuritis; (*3*) Spleen

and hematopoietic system: generalized Hodgkin's disease.—*Addendum to "Hodgkin's granuloma with pericardial effusion," J. A. Hagans, Am. Heart J., October, 1951, 42: 636.*—(*G. C. Leiner*)

Thoracic Chordoma.—Chordomata are tumors arising from the remnants of the notochord. Of all cases reported in the literature, 47 were cranial, 14 vertebral, and 87 caudal. Only 2 of the 14 vertebral cases were thoracic. A case is reported in which the presentation was as a tumor of the upper posterior mediastinum. It was attached to the third and fourth thoracic vertebrae and showed signs of bronchial and esophageal pressure. It was removed surgically. The tendency to recur or metastasize is common.—*Thoracic chordoma, G. G. Crowe & P. B. L. Muldoon, Thorax, December, 1951, 6: 403.*—(*A. G. Cohen*)

Pneumothorax in Metastatic Sarcoma.—In 2 cases of sarcoma, primary in bone, pulmonary metastases were associated with spontaneous pneumothorax. In the first, the lungs were roentgenographically normal at the time of operation, but eight months later there were massive nodules bilaterally and a partial pneumothorax on the right side. In the second case the initial chest roentgenogram immediately prior to operation did not disclose pulmonary metastases or pneumothorax. Three weeks later there was slight collapse of the right lung but no obvious metastases. Two months later, bilateral metastases and a slightly greater degree of pneumothorax on the right were seen. Previous cases have demonstrated a bronchopleural fistula developed in a necrotic subpleural nodule. In some cases, as described by Macklin and Macklin, air from ruptured alveoli may dissect through the perivascular connective tissue spaces toward the mediastinum or the visceral pleura and, thence, into the pleural space.—*Pulmonary metastatic sarcoma with associated pneumothorax, T. F. Leigh & E. A. Thompson, Am. J. Roentgenol., December, 1951, 66: 900.*—(*T. H. Noehren*)

Intrathoracic Lymph Node Metastases.—A total of 103 selected patients with proved primary carcinoma of the lung at operation were found to have metastases to the regional lymph nodes. Enlarged nodes may project into the lung and be visualized by contrast with aerated lung; they may alter the normal contours of mediastinal structures or cause displacement of the mediastinal structures. It has not been possible to determine a relationship between the segment of the lung involved by the primary tumor and the group of lymph nodes invaded by the metastases. It has been concluded, however, that when a given lobe of the lung harbors the primary tumor, certain lymph node groups are more frequently involved than others. When enlarged lymph nodes are visualized, they should be identified and so described that they will be sought at operation or, if resection is contraindicated and radiation treatment is to be used, will be included within the field of treatment.—*Roentgen diagnosis of intrathoracic lymph node metastases in carcinoma of the lung, J. J. McCort & L. L. Robbins, Radiology, September, 1951, 57: 339.*—(*W. J. Steininger*)

Pericardial Celomic Cysts.—Pericardial celomic cysts probably originate on the basis of a failure of a primitive pericardial lacuna to fuse with the pericardial space. While the diagnosis cannot be definitely established roentgenologically, it must be considered in the presence of a mass located anteriorly in the chest, especially if it is in either costophrenic sulcus.—*Pericardial celomic cysts, J. C. Bates & F. Y. Leaver, Radiology, September, 1951, 57: 330.*—(*W. J. Steininger*)

Bronchogenic Cysts.—Of 19 proved cases of bronchogenic cysts, 16 were in men; the patients were from eighteen to fifty-one years of age. The cysts are thin-walled, lined with bronchial epithelium, ovoid, and usually filled with fluid. They may be either mediastinal or intrapulmonary. There are no symptoms until the cyst grows large enough to produce a pressure disturbance of an adjacent organ or becomes infected. An important diagnostic point

is the ovoid shape of the cyst. The shape may change on inspiration and expiration. Differentiation of the fluid-filled cyst from a malignant neoplasm is usually quite difficult and thoracotomy is indicated even in the asymptomatic cases. When the cyst communicates with a bronchus, as occurred in 20 per cent of this series, the cyst contains both fluid and air. Final diagnosis rests on the pathologic study of the excised cyst.—*Bronchogenic cysts, R. J. Healy, Radiology, August, 1951, 57: 200.* (*W. J. Steininger*)

Thoraco-abdominal Fistula.—The introduction of radiopaque substance into sinus tracts situated in the abdominal region revealed the existence of a communication with the thoracic cavity in 3 cases. The contrast medium was introduced under fluoroscopic control, with the patient in the Trendelenburg position. It is concluded that this diagnostic method is a valuable aid in the interpretation of obscure pulmonary pathology in the presence of an abdominal fistula.—*Über die Entstehung und den röntgenologischen Nachweis von Brustraum-Bauch-Fisteln, F. Caspers, Fortschr. Röntgenstrahl., September, 1951, 75: 322.*—(*L. Molnar*)

Herniation of Lung in Cervical Region.—In 2 patients the lung herniated in the cervical region, immediately posterior to the clavicle. Herniation of the lung may be congenital or acquired. Congenital hernias are associated with weakness of the chest wall and increase in intrathoracic pressure. The acquired types may be spontaneous, in which event there is usually an underlying congenital weakness of the chest wall. They may be the result of weakening of the thoracic wall by trauma or disease. Roentgenograms taken during forced expiration against a closed glottis show a prominent tumor which is no longer present in a film taken on inspiration unless the hernia is irreducible and incarcerated. Air is demonstrable in the herniated mass (Authors' summary).—*Herniation of the lung in the cervical region, H. A. Reinhart & M. B. Hermel, Radiology, August, 1951, 57: 204.*—(*W. J. Steininger*)

Blood Infusion After Pneumonectomy.—In order to avoid displacement of the mediastinum and over-distension of the contralateral lung after pneumonectomy, blood was infused into the empty space. The quantity of injected blood usually varied from 300 to 400 cc., but occasionally was greater. Penicillin, 200,000 units, was added to each 100 cc. of blood. Only blood of the same type was injected. An antihistaminic preparation was given before, during, and after the infusion. With pneumonectomy for tuberculosis, the infusion was performed four or five months after surgery; with pneumonectomy for other causes, one month after the intervention. Of 34 patients so treated, 30 had the mediastinum maintained in the midline; in 4 there was slight deviation. Fever occurred in 28 patients, usually not exceeding 100° or 101°F.; 15 patients developed bronchitis. There was one case of subicterus before the routine use of antihistaminic agents; one patient was intolerant of the procedure.—*Traitement des cavités laissées par les pneumonectomies. L'avenir du mediastin et du poumon restant, Métras & Gaillard, Rev. de la tuberc., 1951, 15: 602.*—(*V. Leites*)

Changes in Blood Volume Following Operation.—The blood volume of 20 patients with congenital cyanotic heart disease, pulmonic stenosis, and right to left intracardiac shunts was studied with both the Evans blue dye and radioactive phosphorus methods. Thus, it was possible to make simultaneous direct measurements of plasma volume and whole blood volume. Cyanotic patients in both childhood and adult groups were found to have diminished plasma volume, greatly increased red cell volume, and elevated whole blood volume when compared with noncyanotic individuals. Most of the patients subsequently were provided with an anastomosis between a systemic and a pulmonary artery by the Blalock method or by the Potts technique. Direct

measurements of plasma and whole blood volumes have been made in 10 of these patients at periods of three and one-half months to thirteen months after operation. Comparison of the postoperative values with those before operation and with similar data from noncyanotic subjects show that there is a great reduction in red cell volume, a rise in plasma volume, and a reduced but still moderately elevated whole blood volume after an adequate pulmonary flow has been established by operation.—*Changes in blood volume following operation for pulmonic stenosis: Studies with Evans blue and radioactive phosphorus, R. C. Clay, S. R. Elliott, II, & H. W. Scott, Jr., Bull. Johns Hopkins Hosp., November, 1951, 89: 377.*—(*J. S. Woolley*)

Electrostimulation of Respiratory Center.—A 45-year-old housewife with a history of bromide psychosis and chronic alcoholism was hospitalized in a semi-stuporous state. Her temperature was normal; neurologic examination was noncontributory. After supportive treatment her condition improved initially. After sixteen hours, however, her condition became worse. Her temperature rose to 102°F., and her respiration became extremely shallow. A low-modulation, alternating electric current varying from 3 to 12 milliamperes was directed through the diencephalic area of the brain for stimulation of the respiratory center. Dramatic improvement was almost immediately noted. The respiratory rate changed from 55 to 14 per minute. The current was applied for two and one-half minutes. During the next forty-eight hours the treatment had to be repeated five times. The patient made a complete recovery. The final diagnosis was respiratory depression due to drugs, with superimposed pneumonia.—*Electrostimulation in respiratory emergency: Report of a case, G. Zimmerman, Jr., J.A.M.A., July 14, 1951, 146: 1026.*—(*H. Abeles*)

Positive Pressure Breathing.—Bronchospasm is important in the production of dyspnea in patients with fibrosis and emphysema, regardless of the cause of these conditions. Impaired movement of the diaphragm, loss of lung elasticity, and bronchial obstruction may so limit breathing that the usual methods of aerosol therapy are unable to effect an even distribution of the medication. Intermittent positive pressure therapy provides more satisfactory subjective relief for patients with chronic pulmonary ailments accompanied by fibrosis and emphysema. In severely disabled cases several months of daily treatments may be required to obtain an optimal response. Some individuals so treated have been able to work with one or 2 intermittent positive-pressure breathing treatments a day; previously, the severe dyspnea was completely disabling. In a few patients, a negligible or no change occurs. Studies of pulmonary function before and after treatment have revealed that the measurable changes are primarily related to the volume of, and the resistance to, air moving in and out of the lungs, namely, vital capacity, maximal breathing capacity, and instantaneous inspiratory and expiratory flow-rate patterns. Measurements after two or three weeks of treatment have not revealed significant changes in the distribution factor as measured by arterial blood and expiratory gas studies. Any significant change in the pulmonary emphysema was rare. Maximal breathing capacity is the most significant and simplest objective measurement which can be correlated with subjective and clinical improvement. Although cortisone increased the maximal breathing capacity in some silicotic persons, there remained a significant degree of bronchospasm which could be relieved by intermittent positive pressure breathing combined with bronchodilator drugs. The combined therapy appears to be beneficial when cortisone is used in the treatment of silicosis. In one case of acute irradiation fibrosis, intermittent positive pressure breathing was used without a bronchodilator drug for two weeks; during the last ten days, 100 mg. of cortisone acetate was given daily. This intermittent positive pressure breathing and cortisone in-

creased the vital capacity from 1,108 to 1,565 cc. and the maximal breathing capacity from 58 to 95 liters per minute. This improvement has been maintained for six months without further therapy.—*Treatment of chronic pulmonary disease with intermittent positive pressure breathing: I. Evaluation by objective physiological measurements, H. L. Motley & J. F. Tomashefski, A. M. A. Arch. Indust. Hyg. & Occup. Med., January, 1952, 5: 1.*—(*T. H. Nochren*)

Action Currents of Lung Tissue.—In the basis of thoracoscopic observations, the author believes that atelectasis is a phenomenon of active contraction of the pulmonary parenchyma which can take place without necessarily involving bronchial occlusion. For this phenomenon, the existence of smooth muscle fiber in the alveolar walls is essential. The author set out to prove the existence of these fibers by demonstration of action currents. During thoracoscopy, an electrode was placed on the visceral pleura and an indifferent electrode in one of the intercostal spaces. A fairly constant pattern was observed for both a healthy and an atelectatic lobe. Injection of acetylcholine into a leg gradually transformed the curve of a healthy lobe into one of atelectasis. By this technique, the author was also able to demonstrate curves of atelectasis in the lung tissue surrounding a cavity which closed after Monaldi suction; normal curves were found around those cavities which did not close.—*Currents of action in pulmonary parenchyma, C. Xalabarder, Tubercle, October, 1951, 32: 214.*—(*A. G. Cohen*)

Primary Pulmonary Hypertension.—Primary pulmonary hypertension has emerged as an entity since the advent of right heart catheterization as a cause of isolated right ventricular hypertrophy whether or not associated with pulmonary vascular sclerosis. The clinical syndrome has been described under such names as "primary pulmonary vascular sclerosis," "right ventricular hypertrophy of obscure origin," and "idiopathic pulmonary hypertension." Its salient features are exertional weakness and dyspnea in patients who subsequently develop right heart failure without antecedent cardiac or pulmonary disease. Effort syncope and angina are significant; sudden death is frequent. The pertinent physical findings are normal systemic blood pressure, clear lungs, accentuated pulmonic second sounds, and variable or absent heart murmurs. Venous distention and hepatomegaly occur unassociated with peripheral edema or ascites except late in the course of the disease. Cyanosis is a terminal feature unless the disease is complicated by a patent foramen ovale. This syndrome has been seen in both sexes at all ages but is most common between the ages of 20 and 40 years. Electrocardiograms are consistent with right ventricular hypertrophy. The characteristic roentgenographic findings are (*1*) right ventricular enlargement, (*2*) bulging pulmonary artery segment, (*3*) prominent hilar vessels, and (*4*) normal or diminished intrapulmonary vascular markings. Marked right ventricular hypertrophy is constant, but the nature, severity, and distribution of the pulmonary vascular changes proximal to the capillary bed vary considerably and may be absent. Pulmonary function studies performed in 2 patients revealed no intrinsic lung disease. Hemodynamic studies, utilizing the technique of right heart catheterization, were performed in 3 patients. All had greatly elevated pulmonary artery pressures, elevated right ventricular end diastolic pressures, diminished cardiac outputs, increased arteriovenous oxygen differences, and normal arterial blood oxygen saturations. The blood volumes and hematocrits were normal in 2 patients and slightly elevated in the third. One patient had no clinical evidence of right heart failure and none had edema. A seven- to nine-fold increase in pulmonary resistance was present at rest. Physiologic studies and post-mortem findings supported the view that the locus of increased resistance is in the small pulmonary arteries. Isolated overactivity of the sympathetic nervous system was suggested by the pronounced effect of priscoline, an adrenolytic and sympatholytic agent, in lowering the pulmonary artery blood pressure.

Sympathectomy might be considered for primary pulmonary hypertension.—*Primary pulmonary hypertension: I. Clinical and hemodynamic study, D. T. Dresdale, M. Schultz, & R. J. Michtom, Am. J. Med., December, 1951, 11: 686.*—(*T. H. Noehren*)

Pulmonary Arteriolosclerosis.—Requirements for inclusion of cases under the diagnosis of primary pulmonary arteriolosclerosis are (*1*) significant hypertrophy of the right ventricle but not of the left and (*2*) absence of all factors commonly believed to cause secondary pulmonary vascular sclerosis, pulmonary hypertension, or isolated strain on the right side of the heart. The etiology of this disorder has not been determined, but pulmonary hypertension of unknown origin may cause the changes in the pulmonary vessels. Primary pulmonary arteriolosclerosis with hypertrophy of the muscle of the pulmonary arteries occurred in a 34-year-old female nurse. The outstanding manifestation, demonstrable by roentgen examination, was dilatation of the pulmonary artery without evidence of disease in the lungs. This condition is found equally in men and women, the age frequency is variable, and previously reported cases showed roentgen evidence of enlargement, dilatation, or prominence of the pulmonary artery or conus. Many show right axis deviation on the electrocardiogram. Dyspnea and cyanosis are reported in approximately three-fourths of the patients. It is believed that sudden death in some cases might be due to acute coronary insufficiency arising from the greatly diminished volume of blood delivered to the left ventricle through the obstructed pulmonary circulation.—*Cor pulmonale resulting from pulmonary arteriolosclerosis, J. S. Wells & P. Brown, Am. J. Roentgenol., December, 1951, 66: 894.*—(*T. H. Noehren*)

Pulmonary Vascular Sclerosis.—A 27-year-old white woman and a 48-year-old Negro woman developed Ayerza's syndrome, the first following delivery of her second baby, the latter following hysterectomy and bilateral salpingo-oophorectomy. The two cases had the following features in common: (*1*) right heart failure, with exertional dyspnea and cyanosis being prominent in the first case and a hacking cough and cyanosis occurring in the second; (*2*) mild polycythemia; (*3*) hypertrophy and dilatation of the right ventricle; (*4*) widespread pulmonary vascular sclerosis; (*5*) occlusive masses in many small pulmonary arteries, in the first case being either embolic or thrombotic, in the second representing precipitated protein; the serum of this patient contained cryoglobulin (cold precipitable globulin); (*6*) normal lungs on roentgenologic and gross examination; (*7*) focal pneumonitis; (*8*) passive hyperemia of the viscera; (*9*) centrolobular damage of the liver; (*10*) ascites; (*11*) rapid clinical course. It is believed that in these cases occlusive masses in the small pulmonary arteries caused vascular sclerosis. The term "thromboembolic pulmonary endarteritis" is suggested.—*Thromboembolic pulmonary vascular sclerosis, E. E. Muirhead, P. O'B. Montgomery, & C. E. Gordon, A. M. A. Arch. Int. Med., January, 1952, 89: 41.*—(*G. C. Leiner*)

Pulmonary Vascular Resistance.—Changes in pulmonary resistance were studied in a lobe of lung retaining its natural blood supply by simultaneous optical registration of pulmonary arterial pressures and rates of venous outflow from the lobe. To avoid capacity changes on pressure-flow relations, all observations were made while the lobe was maintained in states of static inflation or deflation. Both positive and negative pressure inflation of the lung were investigated. The results reported show that alterations in pulmonary arterial pressure and flow are accompanied by passive changes in pulmonary resistance opposite in direction to that of the pressure changes. Since these passive changes are much greater than those which occur in peripheral systemic circuits so far studied, it was considered necessary to compare pressure-flow relations over considerable ranges before and after another physiologic variable was introduced. Comparison of curves representing such pressure-flow relations during pulmonary deflation and inflation

have shown that pulmonary resistance is higher during lung expansion at equivalent conditions of pressure and flow. This was true regardless of whether the lungs were inflated by negative pressure in a closed chest or were expanded by positive intratracheal pressure in an opened chest. Injection of epinephrine directly into an artery of a lobe, as well as into the general venous circuit, produced a small but definite increase in resistance within a lung lobe at equivalent conditions of pressure and flow under static positive pressure inflation (Author's summary).—*The effects of lung inflation and epinephrine on pulmonary vascular resistance, W. S. Edwards, Am. J. Physiol., December 1, 1951, 167: 756.*—(*G. C. Leiner*)

Heart in Silicosis.—The correlations of pathogenic dust with roentgenologic, radiokymographic, and electrocardiographic findings were studied in approximately 1,500 cases of silicosis. Enlargement along the left cardiac border was noted in 52 per cent of silicotic miners in the Ruhr, in 47 per cent of the cases among the Siegerländer iron ore miners, in 55 per cent among grinders, and in 36 per cent among refractory brick workers. This finding was twice as frequent among the Ruhr miners in the first and second stages of silicosis as in workers in other dusty trades. This enlargement of the heart shadow is interpreted as hypertrophy of the left ventricle, due to the particularly difficult working conditions in the coal mines. In the later stages of the disease, enlargement along the left border was either absent or associated with a prominent pulmonary conus, indicating hypertrophy and dilatation of the right ventricle. Extensive fibrosis, retraction, and pleuropericardial adhesions is characteristic of the third stage of the disease in coal miners, in ceramic workers, and in workers in the refractory brick industry and the heart shadow assumes a vertical position, determined by its displacement and rotation. The interpretation of the roentgenologic appearance of the heart in these conditions was often impossible. With beginning failure, the heart shadow sometimes appeared symmetrically enlarged on both sides, due to the dilatation of both ventricles. Right axis deviation was found more frequently in cases of silicosis among coal miners, refractory brick workers, and iron ore miners. Myocardial damage was more frequent in grinders and sandblasters; in the former group, particularly in the second stage of the disease. This was probably due to the frequent association with tuberculosis. Associated tuberculosis was generally more common among individuals whose electrocardiogram showed signs of myocardial damage. Arrhythmias were noted in a number of patients with pericardial adhesions localized in areas essential for the formation and conduction of the stimuli. This was often the case when right upper field scarring exerted traction on the auricle. In 40 cases of silicosis examined radiokymographically, it was found that the right ventricle participated in the formation and in the excursions of the right cardiac border only if it were enlarged and dilated. Localized myocardial damage could also be detected on kymograms. The radiokymographic examination associated with the Valsalva experiment sometimes gave information as to the status of the myocardial wall.—*Über die Herzveränderungen bei der Silicose, R. Haubrich, Fortschr. Röntgenstrahl., September, 1951, 75: 303.*—(*L. Molnar*)

Thrombosis of Axillary Vein.—A 41-year-old housewife presented the characteristic picture of "effort" thrombosis of the axillary vein caused by violent swinging of her arm in the act of spanking a child. Pulmonary embolism resulting in infarction with a left-sided pleural effusion occurred six days after the trauma. The patient was treated successfully with anticoagulants, antibiotics, and rest.—*'Effort' thrombosis of the axillary vein with pulmonary embolism, T. Barnett & L. M. Levitt, J.A.M.A., August 11, 1951, 146: 1412.*—(*H. Abeles*)

Transposition of Great Vessels.—Clinical and radiologic studies in 10 proved cases of complete transposition of the great vessels

and the recent literature show that the radiologic features are distinctive among the congenital cardiac malformations of the cyanotic group. In conjunction with the clinical data, they usually permit accurate diagnosis to be made during life. In atypical cases, angiocardiography, by demonstrating the transposed aorta, is an invaluable diagnostic aid.—*Diagnosis of complete transposition of the great vessels, H. L. Abrams, H. S. Kaplan, & A. Purdy, Radiology, October, 1951, 57: 500.—(W. J. Steininger)*

Anomaly of the Vena Cava Inferior.—In the course of doing a pneumonectomy for carcinoma, a dilated vein was encountered in the normal position of the azygos vein. This vein was invaded by tumor tissue and had to be resected. Inspection of the right diaphragm and the caval hiatus revealed a normal vessel entering the right auricle at this level. The patient died on the first postoperative day. Post-mortem examination revealed a left-sided vena cava inferior. The hepatic vein drained directly into the right auricle and in no way communicated with the vena cava inferior.—*Anomaly of the vena cava inferior: Report of fatality after ligation, D. B. Effler, A. E. Greer, & E. C. Sifers, J.A.M.A., August 4, 1951, 146: 1321.—(H. Abeles)*

Post-Mortem Chest Roentgenograms.—The clinical picture, postmortem pathologic observations, and roentgenographic findings of pulmonary congestion, edema, infarction, pneumonia, and atelectasis are correlated. Most of the roentgenograms were taken post mortem by a special technique. Not infrequently pathologic and roentgenographic findings are at variance. These differences are due to (*1*) terminal pathologic changes, notably fluid in the pleural cavities; (*2*) lack of characteristic roentgenologic differences between pathologic entities; (*3*) inadequate portable roentgenographic equipment; and (*4*) associated pathologic findings which obscure the picture.—*Correlation of postmortem pathological observations with chest roentgenograms. D. S. Beilin, J. P. Fink, & L. W. Leslie, Radiology, September, 1951, 57: 361.—(W. J. Steininger)*

Lesions of the Lingula.—When the pulmonary lingula is diseased, certain characteristic roentgen findings are usually present. One outstanding finding, almost constantly present in the frontal view, is often the first clue to the presence of a lesion, namely, a partial or complete obliteration or distortion of the normally sharp left cardiac border, due primarily to pleuro-pericardial adhesions. Poor definition without distortion of the cardiac border is most commonly seen in acute lesions, such as virus pneumonia, and with complete healing there is a return of the sharp definition of the border. In chronic disease, the lingula is subject to considerable variation in size. With processes such as bronchiectasis and interstitial pneumonitis, atelectasis and fibrosis usually occur, contraction results, and there is shrinkage of the lingula towards the left hilus. In carcinoma, the lingular volume may be increased. There is considerable variation in the degree of bronchographic filling. Failure of lingular filling is as important as good filling and is usually due to obstruction by thick tenacious secretions, stricture, or neoplasm.—*Roentgenographic findings in lesions of the lingula, T. F. Leigh & W. A. Hopkins, Radiology, August, 1951, 57: 193.—(W. J. Steininger)*

Balanced Chest Roentgenography.—Uniformly diagnostic chest roentgenograms are difficult to obtain when the lungs are of unequal density. There are two groups of conditions in which this problem is encountered: those in which there is an increase, and those in which there is a decrease, in the density of one hemithorax. Among the former may be listed scoliosis, unilateral pleural changes associated with fluid or fibrosis, extensive one-sided pulmonary involvement of inflammatory or neoplastic origin, atelectasis of one lung, and thoracoplasty. The causes of decreased roentgen-ray density in one lung include removal of the breast and its surrounding soft tissue, atrophy of the pectoral and intercostal

muscles as a result of poliomyelitis, marked unilateral emphysema, and some cases of pneumothorax. In all of the foregoing instances the roentgen-ray exposure which might be preferred for one side of the chest would prove either excessive or inadequate for the opposite side. This situation is accentuated by the often necessary use of stationary or Potter-Bucky grids in either conventional or laminagraphic studies. A simple set of tin cut-outs aid toward balanced chest roentgenography. These may be used singly or doubly, by superimposing one over the other, as the occasion demands. Used as a compensating filter in front of the roentgen tube, its border fails to cast a sharp line on the roentgenogram. Rather, at the usual working distances a graduated effect is obtained.—*Balanced chest roentgenography, I. J. Kane & S. Heiser, Am. J. Roentgenol., December, 1951, 66: 967.*—(*T. H. Noehren*)

Bronchography in Children.—After experimenting with various techniques for bronchography in children, the following was evolved: Preliminary postural drainage is given. Premedication with atropine and omnipon is given one hour previously. Anesthesia in induced with cyclopropane and oxygen. As soon as possible, the child is intubated with the largest endotracheal tube which can be passed. Anesthesia is continued with nitrous oxide oxygen and ether. A fine gum-elastic suction catheter has been previously marked with the length of the endotracheal tube. This is now introduced inside the tube to the mark. The oil is injected through a syringe, the amount of iodized oil needed for each lung being 1 cc. per year of age up to 5 cc. The right lung is done first. The child is postured and the oil introduced separately for each lobe. The flow of ether is turned off before the roentgen apparatus is used. When the roentgenograms have been seen, the oil is suctioned from the bronchial tree. The method has been used in 250 cases, with one complication. Satisfactory results are now obtained in at least 80 per cent.—*Bronchography in children, M. Bates, I. C. W. English, H. M. Foreman, & T. M. Wilson, Thorax, December, 1951, 6: 408.*—(*A. G. Cohen*)

Bronchography with Sulfanilamide.—Using as contrast substance 10 gm. of sulfanilamide dissolved in 20 cc. of viscous iodized oil, bronchography was performed by the usual methods. Excellent bronchograms were obtained. There was no alveolar filling, and emptying was rapid. There was also some therapeutic effect.—*Bronchography with a suspension of sulphanilamide in iodized oil, H. G. H. Houghton & J. H. Rolland-Ramsay, Brit. J. Tubere., October, 1951, 45: 183.*—(*A. G. Cohen*)

Bronchography with Umbradil.—Umbradil or Xumbradil, discovered in Sweden, consists of an aqueous solution of diethanolamine and carboxymethylcellulose with 5 per cent xylocaine, and is a water-soluble opaque substance for use in bronchography. Injected into the bronchi of cats and rabbits, its effects have been similar to those of physiological saline solution. Both are somewhat irritant to the bronchial tree. The iodine in Umbradil is eliminated by the kidneys; the carboxymethylcellulose is ingested by the alveolar phagocytes. Umbradil is contraindicated in acute nephritis, acute bronchopulmonary infections, and in very asthenic individuals. In practice, morphine and atropine were administered an hour before the examination. General anesthesia was used only for children who could not cooperate; for older patients, pantocaine was preferred. Bronchial secretions were aspirated through the bronchoscope. The opaque substance was then slowly instilled into the desired lobe or segment through an opaque rubber sound placed without the aid of fluoroscopy. The course of the fluid in the bronchial tree was followed fluoroscopically and radiographs were taken as promptly as possible anteroposteriorly, laterally, and obliquely. In no case was evidence found of the opaque fluid remaining in the lungs five hours after the examination. In all cases the substance was well tolerated and was rapidly

eliminated.—*Bronchographie et substances opaques hydrosolubles, J. Hallé, L. Montminy, & M. Bilodeau, Laval méd., January, 1952, 17: 17.*—(*A. T. Laird*)

Roentgen Diagnosis of Pericardial Effusion.—While the size and contour of the heart shadow in pericardial effusion may be simulated by any other type of heart disease, there are distinctive points of differentiation. With early effusions, there is an increase in the length of the heart shadow; the cardiohepatic angle becomes more acute. As the size of the effusion increases, there is further lengthening of the heart shadow, but the transverse diameter also becomes enlarged so that it may equal or exceed the length. The auriculoventricular junction on the left is obscured and, with large effusions, the cardiovascular junction on the right is obliterated. The vascular pedicle is usually small in comparison with the greatly enlarged heart shadow. Pulsations of the heart are markedly diminished and may be absent except in the region of the vascular pedicle. Distinctive changes in the outline of the barium-filled esophagus with pericardial effusion and with ventricular failure are new diagnostic signs. Pericardial effusion produces a large, smooth pressure concavity on the esophagus, which resembles the deformity produced by an enlarged left atrium in mitral stenosis but is at a lower eosophageal level. A heart with right and left ventricular failure produces a double curve in the esophagus, like a reversed figure 3. The acute cardiohepatic angle is an important typical diagnostic sign of pericardial effusion.—*The roentgen diagnosis of pericardial effusion, G. Levene & S. A. Kaufman, Radiology, September, 1951, 57: 373.*—(*W. J. Steininger*)

Angiography in Lung Carcinoma.—Diminished vascularity as manifested in angiocardiograms by reduction in the number and size of vessels in an area of lung, as well as delayed filling, has been used for the diagnosis of bronchiogenic carcinoma. Less frequent changes are obstruction or distortion of the superior vena cava, the pulmonary arteries, or their branches. Among the pulmonary angiograms of 396 patients, there were 40 cases of carcinoma. Approximately half of all the patients had apparently normal lungs. The remainder had various pulmonary parenchymal diseases. Of the 40 cases of bronchiogenic carcinoma, 37 had characteristic abnormal pulmonary vascular patterns. Of the 3 cases without angiographic abnormalities, 2 had extensive carcinoma involving both main stem bronchi and the carina prior to the appearance of a mass roentgenographically. At necropsy there was little pulmonary parenchymal involvement. The other case had a small lesion in a posterior juxtapleural location. In 10 cases no diagnostic procedure, except angiography, disclosed the nature of the pathologic process. There were 2 cases in which the angiogram showed diminished vascularity considered characteristic for neoplasm, and no evidence of malignancy was found in the resected specimens. In one, a broncholith blocked the orifice of the upper lobe bronchus and extensive chronic inflammation with scarring had completely obstructed the pulmonary arterial branches to the upper lobe. In the other, a submucosal osteochondroma obstructed the left lower lobe bronchus with atelectasis and packing of arterial radicles within this lobe. There are other lesions which produce diminished vascularity within the lung parenchyma. Emphysematous blebs are the most common cause but these are not associated with a mass and are often multiple; there is little difficulty in distinguishing between blebs and carcinoma. A large inflammatory abscess also does not show vessels within its cavity. However, there is usually increased vascularity in the surrounding inflammation and the lung parenchyma distal to the abscess shows normal vascularity.—*Further observations on the diagnostic value of pulmonary angiography in bronchiogenic carcinoma, D. J. Schissel & P. G. Keil, Am. J. Roentgenol., January, 1952, 67: 51.*—(*T. H. Noehren*)

Radioactive Gold for Cancer.—After earlier trials of radioactive zinc, 3 cases of inoperable bronchogenic carcinoma and one case of lymphogranuloma were treated with radioactive gold. The gold suspension can be given intravenously or may be introduced into the right ventricle or one of the pulmonary arteries by cardiac catheterization. Lobar dissemination of the radioactive gold can thereby be attained in amounts sufficient for local treatment. Intrapleural application of a colloidal solution of radioactive gold was also performed. There are advantages in combining radioactive gold, deep roentgen therapy, and excisional surgery.—*Ueber eine Originalmethode der Therapie von Lungenkrebsen mit künstichler Radioaktivität, J. H. Müller, P. H. Rossier, & C. Maier, Schweiz. med. Wchnschr., July 14, 1951, No. 28: 683.*—(*E. Dunner*)

Post-Irradiation Pulmonary Reaction.—Corticotropin (ACTH) and cortisone were employed in a patient in whom an unusually severe post-irradiation reaction in the lung occurred after roentgen therapy for a pulmonary metastasis. The hormones halted and partially reversed the symptoms and signs of this severe, acute post-irradiation reaction. Two months after ACTH and cortisone were discontinued, late irradiation changes of atelectasis and fibrosis had appeared. There had been no recurrence of acute symptoms.—*Use of ACTH and cortisone in the treatment of post-irradiation pulmonary reaction, S. W. Cosgriff & M. M. Kligerman, Radiology, October, 1951, 57: 536.*—(*W. J. Steininger*)

ANTIMICROBIAL THERAPY

Tuberculous Meningitis.—Of 140 cases of tuberculous meningitis, all but 15 were in children less than fifteen years of age. There were detectable contacts in 50 per cent. In 26 cases, some form of tuberculosis had been known prior to the meningitis. Possible precipitating factors occurring within two months were measles in 18 cases, head trauma in 8, whooping cough in 6, and miscellaneous in 9. In cases of miliary tuberculosis, the possibility of meningitis must be borne in mind, and lumbar punctures must be done every month. The Mantoux test was positive in all but 3 cases. The cerebrospinal fluid showed lymphocytosis; chloride determinations were unreliable. In searching for tubercle bacilli, 10 to 20 cc. of the fluid should be centrifuged. Chest roentgenograms showed miliary lesions in 22 per cent, an uncomplicated primary complex in 41 per cent, miscellaneous evidence of active disease in 8 per cent, and no changes in 29 per cent. Initiation of therapy should not await the discovery of tubercle bacilli. Lymphocytosis and low sugar in the cerebrospinal fluid are pathognomonic. There were four plans of therapy, each an improvement upon the preceding one. In plan *A*, alternating patients received either intramuscular streptomycin or both intramuscular and intrathecal injections as in plan *B*. In plan *B*, treatment lasted five months. Intramuscular injections were given daily during the first to third months and the fifth month. Daily intrathecal injections were given during the first and third months. In plan *C*, the rest periods from intrathecal injections were eliminated until recovery took place. In plan *D*, daily intramuscular injections were given for at least six months. Intrathecal injections were given daily until (*1*) the patient was well, (*2*) the temperature remained below 99.4°F., (*3*) six weeks had elapsed since the last positive culture, and (*4*) the cerebrospinal fluid cell count was below 100 per cu. mm., protein below 200 mg. per 100 ml. and falling, and glucose below 40 mg. per 100 ml. Intrathecal therapy was resumed if (*1*) there was a clinical exacerbation, (*2*) the cerebrospinal fluid glucose fell below 30 mg. per 100 ml. on two successive occasions, or (*3*) positive cultures were obtained. The daily intramuscular dose was 20 mg. per pound of body weight up to 2.0 gm., given in two doses. If there is spinal block, the drug may be instilled directly into the ventricles. The rate of survival fell rapidly in the first five months; the curve then gradually leveled off by the twelfth month. There was a mortality rate of 73 per cent in patients less than three years of age and of 45 per cent

in older children. Mortality rate by severity was: early, 33 per cent; middle, 48 per cent; and advanced, 89 per cent. Sequelae were deafness in 15 of 114 cases, retarded development in 6, hemiplegia in 2, hemiplegia and hemianopsia in 2, blindness in 1, and mental defectiveness in 2.—*Tuberculous meningitis, W. L. Calnan, Brit. J. Tuberc., October, 1951, 45: 153.*—(*A. G. Cohen*)

Tuberculous Meningitis.—The results of streptomycin treatment in 82 cases of tuberculous meningitis were assayed in a series including 27 children who were less than two years of age and 36 who were less than three years of age. Using the classification of the Medical Research Council, the distribution of cases follows: early, 11.0; miliary tuberculosis developing meningitis on treatment, 12.2; intermediate, 45.1; and advanced, 31.7 per cent. Classified by type: meningitis alone, 41.5; miliary tuberculosis developing meningitis during treatment, 12.2; miliary and meningeal tuberculosis, 46.3 per cent. Tubercle bacilli were demonstrated by smear, culture, or guinea pig inoculation in 73 cases. The treatment regimen underwent modification with increasing experience. The current practice is to give daily intrathecal injections, excluding Sundays, for twenty-one doses, and after a week's rest, a second course of twenty-one injections. For children less than three years of age, the dose was 25 mg.; from three to nine years, 50 mg.; and more than nine years, 75 mg. Intrathecal injections were discontinued after forty-two injections if (*1*) no tubercle bacilli had been recovered during the previous six weeks, (*2*) the cerebrospinal fluid cell-count one week after the last intrathecal injection was below 100 per cu. mm., and (*3*) the patient showed no other signs of active meningeal infection. At least forty-two intrathecal injections were given after the last presumed evidence of active meningitis was seen. When a spinal block developed, streptomycin was given intracisternally or into the lateral ventricles. Intramuscular streptomycin in doses of 20 mg. per pound of body weight daily was given for at least six months. Relapse or recrudescence was treated by a complete new course, as for a fresh case. In 17 early cases, Sulphetrone was given orally but eventually its use was abandoned. Of 34 survivors, hearing was clinically normal in 28, clinically doubtful in 2, and clinically impaired in 4. It is difficult to determine the relative roles of meningitis and streptomycin in causing deafness. There were 46 deaths and 36 (43.9 per cent) survivals. The great majority of deaths occurred in the first five months after the institution of treatment. Of the 19 early cases and children who developed meningitis while on treatment for miliary tuberculosis, 14 survived of whom 13 have a normal mentality and 11 are free from physical defect. The results were poorer in the other groups. Age appeared to have very little effect upon the prognosis. The occurrence of convulsions or of neurologic signs before admission was of serious prognostic significance. The occurrence of spinal block affected the prognosis adversely. Since the completion of this series, oral *p*-aminosalicylic acid has been included in the treatment. The regimen for intrathecal injections has been changed. Patients now received forty-five injections during the first two months, allowing one day's rest each week in the first four weeks and two days' rest per week in the next four weeks.—*Results of streptomycin treatment in tuberculous meningitis, R. S. Illingworth & J. Lorber, Lancet, September 22, 1951, 2: 511.*—(*A. G. Cohen*)

Infection by Streptomycin-Resistant Tubercle Bacilli.—In 2 instances there has been a primary infection with streptomycin-resistant tubercle bacilli. A patient who developed streptomycin resistance went home and a thirteen-year-old niece was exposed. One and one-half months later, the girl developed tuberculous meningitis. Organisms cultured from the cerebrospinal fluid were found to be streptomycin resistant. The second case was that of a mother who was separated from her three-day-old child because of tuberculosis. After streptomycin treatment, she was sent home and remained

for six months. Her condition deteriorated and her sputum was found to contain streptomycin-resistant organisms. The child, now seventeen months old, was found to be infected, also by resistant organisms. The criteria for establishment of a bona fide case of transmission of tuberculosis by streptomycin-resistant organisms are: (*1*) The strain of tubercle bacillus from the recipient must have been resistant prior to initiation of streptomycin therapy. (*2*) The recipient must have been in contact with another person who was known to harbor resistant organisms. (*3*) Other sources must be excluded.—*Spread of infection by streptomycin-resistant tubercle bacilli, J. T. Harold, Lancet, October 13, 1951, 2: 658.*—(*A. G. Cohen*)

Pharmacodynamics of Streptomycin.—Experimental investigations of the pharmacodynamics of streptomycin resulted in the following findings: (*1*) The decrease in tonus and peristalsis of the intestinal tract and the bacteriostatic effect of streptomycin on microorganisms are due to the existence of two guanidine groups contained in the streptomycin molecule. Without the guanidine groups, streptomycin is no longer toxic in rats. (*2*) Streptomycin has a stronger bacteriostatic effect *in vitro* than dihydrostreptomycin. (*3*) Pretreatment sensitivity testing is important because microorganisms show variations in their resistance. (*4*) In experimental animals, dihydrostreptomycin is one-fifth less toxic than streptomycin. (*5*) In rats, streptomycin causes a delay in the absorption of pyramidon. (*6*) There is a decrease in the glycogen content of the liver of toxic infants. In animals, small doses of streptomycin increase the liver glycogen content.—*Ueber pharmakodynamische Wirkungen des Streptomycins und deren Bedeutung fur therapeutische Fragen der Pädiatrie, J. Ströder, Schweiz. med. Wchnschr., January 19, 1952, No. 3: 58.*—(*E. Dunner*)

Toxicity of Dihydrostreptomycin.—The effect of dihydrostreptomycin sulfate on the auditory nerve was studied in 21 cases. Each patient had received 1.0 gm. daily for at least six weeks. Clinically insignificant labyrinthine damage was found in 2 cases. Clinical deafness developed during, or immediately after, treatment in 3 cases. Audiograms of the other cases revealed fairly well-marked loss in one other case.—*Toxicity of dihydrostreptomycin sulfate for the auditory nerve, C. Don & J. Gregory, Lancet, January 12, 1952, 1: 72.*—(*A. G. Cohen*)

Streptomycin Dependence.—Three types of streptomycin dependence occur: (*1*) "strict streptomycin dependence," in which streptomycin is indispensable for the growth of tubercle bacilli; (*2*) "relative streptomycin dependence," in which streptomycin is not indispensable for growth but makes the colonies appear more rapidly and in greater number; and (*3*) "streptomycin stimulation," in which colonies appear earlier on streptomycin-containing media than on control media, although the final number of colonies is equal or higher on the control media. The existence of any of these three types of dependence can only be confirmed if the phenomenon can be reproduced on two or more successive passages. Among 2,150 strains of tubercle bacilli tested, 980 (45.5 per cent) were streptomycin-resistant to 10 γ per ml. Among these there was one strain which appeared to be streptomycin-dependent on Löwenstein-Jensen medium but, after transfer to Dubos medium, showed equal growth in the absence of streptomycin. "Relative streptomycin dependence" was noted in 3 instances, but could not be reproduced on subsequent transfers. The phenomenon of simple stimulation was the most frequent; it was found in 4 per cent of patients who had strains resistant to 50 γ per ml. and who had been treated with streptomycin alone.—*De la dépendance du Mycobacterium tuberculosis à la streptomycine, P. J. Coletsos, Rev. de la tuberc., 1951, 15: 548.*—(*V. Leiles*)

Subcutaneous Infusion of PAS.—Severely ill patients with high fever do not tolerate well *p*-aminosalicylic acid (PAS) administered by mouth. The intravenous route was

proposed but was not practicable because of the discomfort caused by the continuous infusion and the thrombosis of the veins, despite the use of heparin. Subcutaneous infusion appears to be more satisfactory because a high concentration of the drug can be obtained without serious inconvenience. The dosage recommended is 1,000 cc. of a 2.8 per cent isotonic solution of sodium PAS, corresponding to 21 gm. of PAS. It is given in four injections in the flexor aspect of the thighs or into the abdominal wall, preceded by anesthesia with a 2 per cent solution of Novocain. In sensitive patients a local irritation may be noted or cutaneous eruptions may occur. Renal tests should always precede the administration of such large amounts of the drug because its retention due to renal insufficiency may cause serious toxic effects. A technique of preparing the sterile isotonic solution by filtration is being used with good results. This treatment is successful, alone or in combination with other antibiotics, for severe, extensive exudative disease and for acute hematogenous dissemination.—*Praktisches zur subkutanen PAS-Infusion, G. W. Lauenstein & W. Rockstroh, Deutsche med. Wchnschr., September 14, 1951, No. 37: 1148.*—(*L. Molnar*)

Intravenous PAS.—The use of intravenous *p*-aminosalicylic acid (PAS) has been broadened since Löffler and Moeschlin advocated its use in combination with streptomycin for the treatment of tuberculous meningitis. It is possible to reach PAS blood levels of 40 mg. per 100 ml., but care must be taken not to exceed this concentration in order to avoid vertigo, nausea, and mild collapse. The rate of flow of the solution should be carefully regulated. A daily infusion of PAS, 20 gm., for ten to twelve days combined with streptomycin, 1 gm., intramuscularly each day has been employed in 40 cases and is recommended for (*1*) pre- and post-operative use in resection and decortication cases, (*2*) acute pleurisy with effusion, and (*3*) recent bronchogenic or hematogenous dissemination.—*Zur intravenösen Anwendung von Para amino salicylsäure (PAS), F. Amberg, Schweiz. med. Wchnschr., March 17, 1951, No. 11: 255.*—(*E. Dunner*)

Calciferol, Streptomycin, and PAS for Pulmonary Tuberculosis.—A desirable objective in the streptomycin treatment of pulmonary tuberculosis is to obtain a high concentration of the drug at the site of the disease. In an attempt to achieve this, calciferol in doses comparable to those used in the treatment of lupus vulgaris was given to 11 patients with tuberculosis treated with streptomycin and *p*-aminosalicylic acid (PAS). The dosage of calciferol was 600,000 units in oil once a week intramuscularly for three doses, followed by two doses at two-week intervals, then a dose every four weeks until a total of nine doses (5,400,000 units) had been given. No toxic effects were observed. In general, the results were very satisfactory, although it is not possible to be sure that the streptomycin and PAS were not solely responsible.—*Calciferol, streptomycin, and para-aminosalicylic acid in pulmonary tuberculosis, J. Fielding & J. L. Maloney, Lancet, October 6, 1951, 2: 614.*—(*A. G. Cohen*)

Calpatyl Therapy.—Calpatyl is a combination of 500 mg. of the calcium salt of *p*-aminobenzoic acid (PABA) and 50 mg. of water-soluble hesperidin. It was administered both parenterally and as a suppository over a 30- to 60-day period to more than 100 patients with pulmonary tuberculosis. Side reactions were observed in only 3 patients, one of whom complained of abdominal pain; 2 complained of loss of appetite. Subjective improvement was manifested even after a few injections; appetite improved, weight increased, cough and expectoration decreased. Patients were classified into 9 groups. (*1*) Seriously ill patients: roentgenologic improvement was noted in 5 patients, 10 showed no change, and 2 were worse. (*2*) Combination therapy: calpatyl in combination with streptomycin delays the excretion of streptomycin. There appears to be an antagonistic effect between *p*-aminosalicylic acid and PABA, which makes the combination of these two medications inef-

fectual. (3) Bronchial asthma. (4) Respiratory insufficiency. (5) Vicarious emphysema and silicotuberculosis. (6) Atelectasis. In Groups (3) to (6) small numbers of patients had improvement in vital capacity, ranging from 10 per cent in the silico-tuberculous group to 20 to 40 per cent in the other groups. (7) Tension cavity under pneumothorax: Of 9 patients, the cavity closed in 4 and remained open, although somewhat smaller, in 5 patients. (8) Re-expansion of pneumothorax: 3 patients. (9) Pleuritis: results in 15 patients were difficult to distinguish from that achieved by conservative management.—*Erfahrungen mit Calpatyl in der Therapie der Lungentuberkulose, E. Attinger, Schweiz. med. Wchnschr., November 17, 1951, No. 46: 1133.*—(*E. Dunner*)

Hepatic Toxicity of Amithiozone.—The toxic effects of amithiozone (TB I) on the liver were studied in 12 cases which were observed in a large group of tuberculous patients treated with the drug. Post-mortem examination of 2 of these patients who died with far advanced disease during treatment showed marked fatty degeneration of the liver, much more pronounced than that found in untreated tuberculous patients. The most constant clinical manifestation of liver damage was mild, often prolonged jaundice with serum bilirubin as high as 2.4 mg. per 100 ml. The jaundice is a result of toxic changes in the liver and of increased red blood cell destruction, both side effects of amithiozone. Increased hemolysis and toxic effects resulting from tuberculosis are also responsible, in part, for the pathologic values of hepatic function tests based on protein metabolism. For these reasons, it is difficult to determine the cause of symptoms often attributed to hepatic damage from the drug. In practice, it is sufficient to observe the treated patients carefully, using particularly the erythrocyte sedimentation rate, the hemoglobin value, the presence of urobilinogen in the urine, and the serum bilirubin level. In case of suspected toxicity, reducing the dose is often sufficient; in other cases, *p*-aminosalicylic acid may be substituted. Amithiozone rarely produces serious hepatic damage and its toxic effects are usually reversible.—*Zur Frage der Leberschädigung durch Conteben, H. Hörlein, Deutsche med. Wchnschr., September 14, 1951, No. 37: 1139.*—(*L. Molnar*)

Terramycin Therapy of Pneumonia.—Clinical and bacteriologic findings in 91 patients with pneumonia treated with terramycin offer convincing evidence of its effectiveness against pneumococci. There is also evidence of its effectiveness against hemolytic *Streptococci* and, to a lesser degree, against *H. influenzae*. Clinically, there is suggestive evidence of the effectiveness of terramycin in primary atypical pneumonia in 4 cases. The potent antipneumococcal effect was manifested by the prompt disappearance of pneumococci from the blood in bacteremic cases, their rapid elimination from the sputum in almost all cases, and their absence from pleural fluids obtained after one or more days of terramycin therapy. Fever declined regularly, and symptoms referable to the acute pneumococcal infection began to improve within the first twenty-four to forty-eight hours of treatment. *In vitro*, all of the pneumococci tested were moderately or highly sensitive to terramycin. Appearance in the sputum of *Staphylococci*, slow clearing of the lungs, and recurrence of persistence of leukocytosis indicated that the beneficial effects of terramycin were often partially vitiated by staphylococcal super-infections. Gastrointestinal symptoms from terramycin were frequent and often severe. In many of the patients with terramycin-induced diarrhea, the normal fecal flora was replaced by pathogenic *Staphylococci*, which often added to the morbidity of the patients. In 5 of 7 fatal cases, the toxic effects on the gastrointestinal tract may have contributed to death. In addition, *Staphylococci* played an important pathogenic role in the lungs of 4 of these patients. Comparable cases treated with aureomycin were studied similarly during the preceding season; the clinical and bacteriologic results appeared to be more favorable, the toxic effects were

less serious, and staphylococcal infections did not play an important role.—*Terramycin therapy of pneumonia: Clinical and bacteriologic studies in 91 cases, G. G. Jackson, T. H. Haight, E. H. Kass, C. R. Womack, T. M. Gocke, & M. Finland, Ann. Int. Med., December, 1951, 35: 1175.*—(*T. H. Noehren*)

Micrococcin in Normal and Tuberculous Tissue.—The vascular system in normal and tuberculous tissue was observed microscopically, using a transparent chamber implanted in a rabbit's ear. Suspensions of particles, such as carbon or micrococcin, less than 3μ in diameter and not agglutinable by horse or rabbit serum *in vitro*, were injected into the marginal vein of the unoperated ear. Five minutes after thus introducing india ink, injection emboli passed along the veins within the chamber. These emboli consisted of structureless material in which carbon particles were embedded. They were of various sizes, some being large enough temporarily to block fine vessels. The larger masses were forced slowly through the vessels, but after thirty minutes all of the intravascular or extravascular carbon was removed. Within one and one-half minutes after a suspension of micrococcin in rabbit serum was injected into the marginal vein of the unoperated ear, fine particles passed through the blood vessels in the chamber. A few minutes after the particles were first observed in the blood stream, some adhered to the vessel walls. Micrococcin seemed to adhere most to endothelium at the few places where leukocytes tended to stick. Slight inflammation caused by light pressure on the cover of the chamber increased the sticking of leukocytes. After injection of 200 mg. of micrococcin in 10 ml. of diluted serum, the material adhered to many parts of the vessel walls. This material probably was composed of micrococcin and platelets with some white and red cells intermeshed in the masses. The platelets temporarily but almost completely disappeared following the injections. After approximately twenty-five minutes, the particles were no longer recognizable. Thus, most of the particulate micrococcin injected intravenously became agglutinated with elements of the blood. The agglutinated masses adhered especially to the sticky endothelium of fine vessels of young vessels at the growing edge of newly formed tissue. In another series of rabbits, transparent chambers with normal tissue approximately 30μ thick were inoculated with *M. tuberculosis bovis*. After ten to fifteen days, a tubercle could be recognized, and micrococcin then was injected into the marginal vein of the unoperated ear. Platelet masses containing micrococcin adhered strongly around the developing tubercle. This adherence did not precipitate thrombosis in the vessels, and the circulation continued briskly in vessels plastered with such masses. When micrococcin came to lie within the necrotic part of a developing tubercle through involvement and necrosis of a vessel, there was no observable modification in the development of the tubercle.—*The behavior of intravenously injected particles of carbon and micrococcin in normal and tuberculous tissue, A. G. Sanders, H. W. Florey, and A. Q. Wells, Brit. J. Exper. Path., October, 1951, 32: 452.*—(*H. J. Henderson*)

LABORATORY STUDIES

Lipid Content of Tubercle Bacilli.—The lipid content of young tubercle bacilli four- or five-day-old cultures was compared with that of strains four to six weeks old. The total amount of free lipids represented 7 to 10 per cent of the dry weight of young bacilli as compared with 20 to 22 per cent of older bacilli. Young bacilli contained essentially the same amount of phosphatides as older bacilli. The waxes, however, developed more slowly in the growth of bacilli. A lipo-polysaccharide, similar to the PMK of Choucroun, was found in young bacilli but in much smaller quantities than in older strains. The content of free fatty acids was also much lower in young bacilli (15.3:36.9). Mycolic acid could not be demonstrated in the five-day-old human strain under investigation; it was present in the forty-two-day culture of the same strain. The phosphatide fraction did

not seem to be important for virulence of the bacilli, since young strains of very low virulence contained as much phosphatide as older strains. The formation of giant cells is not the prerogative of the phosphatides since other lipid fractions, such as mycolic acid or the lipo-polysaccharides, possess the same property. The low wax content of young tubercle bacilli and the phenomenon of virulence may be related through the intermediary action of the carbohydrate-lipid fraction. This fraction (PMKo), as well as virulent tubercle bacilli, inhibited chemotaxis of leukocytes; whereas, avirulent tubercle bacilli without the carbohydrate-lipid fraction had a much weaker inhibitory effect on leukocytes. Very young bacilli might therefore show weak inhibition of leukocytes because of their low carbohydrate-lipid content. The Dubos-Middlebrook reaction of virulent bacilli to neutral red is attributed to the presence of the carbohydrate-lipid fraction and free mycolic acid. The low carbohydrate-lipid content of young bacilli and the absence of mycolic acid are in accord with this explanation, since young bacilli give the same color reaction as avirulent bacilli.—*Sur la variation de la teneur en lipides du bacille tuberculeux en fonction de l'âge de la culture, J. Asselineau, Ann. Inst. Pasteur, September, 1951, 81: 306.*—(*V. Leites*)

Effect of Sphingosine on Tuberculin Sensitivity.—The effect of sphingosine and its derivatives on tuberculin sensitivity in guinea pigs was studied. Injections of purified sphingomyelin diminish sensitivity. N-acetylsphingosine is more easily prepared; its effect is roughly comparable to sphingomyelin. It desensitized more rapidly and its effect continued longer than that of approximately equivalent desensitizing doses of cortisone acetate or corticotropin (ACTH). The mode of action of N-acetylsphingosine differs from that of cortisone or ACTH in that it is independent of dietary factors or thyroid activity.—*Action of sphingosine and its derivatives on tuberculin sensitivity in guinea pigs, W. Fisher, C. Harrington, & D. S. Long, Lancet, September 22, 1951, 2: 522.*—(*A. G. Cohen*)

"Alveolar-Capillary Block" Syndrome.—The term "alveolar-capillary block" is tentatively offered to identify a syndrome caused by a variety of pathologic processes, characterized histologically by alterations of the pulmonary diffusing surface, i.e., the alveolar-capillary septa, and physiologically by a reduction in the oxygen diffusing capacity of the lungs. The group of subacute or chronic diseases which leads to this syndrome have common clinical characteristics, prominent among which are diffuse, finely dispersed pulmonary lesions as revealed by the roentgenogram and the resultant signs and symptoms of physiologic disturbances. Twelve cases are presented with various diffuse diseases of the lungs characterized principally by interference with the diffusion of oxygen across the alveolar-capillary septum. The group included 2 patients with pulmonary granulomatosis following exposure to beryllium; one with pulmonary granulomatosis of the Boeck's sarcoid type; one with pulmonary granulomatosis of undetermined etiology, in which the granulomatous lesion contained unusually large numbers of foreign-body-type giant cells and bi-refractile crystals; one patient with scleroderma; 3 patients with pulmonary fibrosis of unknown etiology (in one case after exposure to beryllium; in 2 cases, associated with granulomas in other organs); and 4 cases in which a diagnosis could not be made. The pattern of pulmonary dysfunction consisted of (*1*) reduced lung volumes, (*2*) maintenance of a large maximum breathing capacity, (*3*) hyperventilation at rest and during exercise, (*4*) normal or nearly normal arterial oxygen saturation at rest but a marked reduction of the arterial oxygen saturation after exercise, (*5*) normal alveolar oxygen tension, (*6*) a reduced oxygen diffusing capacity, and (7) pulmonary artery hypertension. In some severe cases the dead space-like ventilation and the venous admixture-like perfusion were increased. These

findings have been interpreted as an indication of the inhomogeneous nature of the pathologic process.—*Clinical and physiologic features of some types of pulmonary diseases with impairment of alveolar-capillary diffusion: The syndrome of "alveolar-capillary block," R. Austrian, J. H. McClement, A. D. Renzetti, Jr., K. W. Donald, R. L. Riley, & A. Cournand, Am. J. Med., December, 1951, 11: 667.—(T. H. Noehren)*

Lung Studies in Polycythemia Vera.—Five cases of polycythemia vera were subjected to detailed pulmonary function studies before and after phlebotomies. A basic change in all 5 patients was an increase in the maximal breathing capacity following venesection. This increase was the only change noted in 2 cases. In the third, an additional aberration was that during exercise there was a failure to increase ventilation significantly, the actual value being approximately one-half of the predicted value. This, in turn, was reflected by an inadequate oxygen consumption during exercise and consequently a decrease in oxygen saturation with exercise. The fourth case demonstrated a marked decrease in vital capacity, total capacity, and maximal breathing capacity. The fifth case demonstrated the same pulmonary function abnormalities, as well as a high diffusion gradient. As a result of these studies it is suggested that the following sequence of events may occur in some patients with polycythemia vera. The increased blood viscosity and volume cause a decrease in the elasticity and an increase in the viscous resistance of the lungs. This leads to a decrease in the maximal breathing capacity and the vital capacity. These changes result in impaired ventilation which gives rise to a poor correlation between ventilation and perfusion, thereby creating a high distribution gradient with resultant arterial oxygen unsaturation, increased arterial pCO_2, and respiratory acidosis. This anoxia would tend to augment the decrease in maximal breathing capacity. In addition, the increased blood viscosity and volume would tend to open the capillary bed of alveoli which are normally poorly ventilated and thus increase the distribution gradient and resultant anoxia. Since polycythemia vera predisposes to thromboses, it is not unreasonable to assume that these may occur in the alveolar capillaries and thereby give rise to a diffusion gradient which would further contribute to the anoxia. Also, since 3 of the 5 cases demonstrated evidence of respiratory center damage, this is considered another mechanism further to impair ventilation and thereby contribute to the anoxia. A final possibility is also suggested as a result of these findings. Cases of polycythemia vera may represent a heterogeneous group. Some of these patients may actually represent a polycythemic response to medullary center damage of unknown etiology.—*Pulmonary function studies in polycythemia vera: Results in five probable cases, W. Newman, J. A. Feltman, & B. Devlin, Am. J. Med., December, 1951, 11: 706.—(T. H. Noehren)*

Carbon Dioxide Effect in Hibernation.—Hibernating hamsters (*Mesocricetus auratus*) and thirteen-lined ground squirrels (*Citellus tridecemlineatus*) were exposed to various concentrations of carbon dioxide, and the changes in respiration and heart rate were recorded. In the normal deeply hibernating state, several differences were observed in the electrocardiogram and in the respiratory pattern of these two species. The respiratory rate of deeply hibernating hamsters and ground squirrels was increased by concentrations of carbon dioxide above 2.5 per cent. The heart rate of ground squirrels usually increased with the respiratory rate, but concentrations of carbon dioxide above 5 per cent were necessary to increase the heart rate of hamsters. Ground squirrels remained in hibernation in spite of the higher heart rate, but the more easily aroused hamsters would waken if exposed for more than a few minutes to concentrations of carbon dioxide higher than 5 per cent. It is concluded that

these rodents in the hibernating state retain the homeostatic mechanism of respiration, in spite of their low body temperature and apparently insensitive condition (Author's summary).—*Effect of increased CO_2 on respiration and heart rate of hibernating hamsters and ground squirrels, C. P. Lyman, Am. J. Physiol., December 1, 1951, 167: 638.*—(*G. C. Leiner*)

Reactions of Pulmonary Blood Vessels.—The reactions of isolated surviving pulmonary arteries and veins of man, swine, dog, and cat were studied. Epinephrine caused constriction of the extrapulmonary arteries and veins of the dog, the extrapulmonary arteries of the cat, and the intrapulmonary arteries of the swine. Acetylcholine caused constriction of the extrapulmonary veins of the dog. Histamine caused constriction of the extrapulmonary veins of the dog and of the intrapulmonary veins of the swine. Epinephrine and histamine caused constriction of human pulmonary arteries and veins. Anoxia did not cause constriction of the isolated pulmonary arteries and veins.—*Reactions of isolated pulmonary blood vessels to anoxia, epinephrine, acetylcholine and histamine, D. J. Smith & J. W. Coxe, Am. J. Physiol., December 1, 1951, 167: 732.*—(*G. C. Leiner*)

Diaphragm and Portal Circulation.—A modified preparation for studying portal hemodynamics in the anesthetized dog minimizes trauma and features the measurement of the extravascular, as well as the intravascular, portal pressure so as to yield the dynamically significant "effective portal pressure". With this preparation, determinations have been made of portal pressure and splanchnic blood flow during normal respiration and accompanying descent of the diaphragm evoked by stimulation of the phrenic nerve. The results indicate that, with descent of the diaphragm, there is a dynamically significant compression of the hepatic and splanchnic vascular beds. This initially acts to squeeze blood from these beds so as to yield a transient augmentation in portal blood flow, even though maintained tetanus of the diaphragm was found to impede blood flow in both the splanchnic and hepatic vascular beds. On the basis of these and other data, it is concluded that diaphragmatic contraction is capable of effectively squeezing blood from the abdominal viscera and thereby augments venous return. Under normal conditions with a slow respiratory rate, the quantitative significance of this augmented venous return appears to be slight. However, under conditions of hyperpnea and possibly in the state of shock, this respiratory augmentation of venous return should be of greater importance (Author's summary).—*Influence of the diaphragm upon portal blood flow and venous return, R. S. Alexander, Am. J. Physiol., December 1, 1951, 167: 738.*—(*G. C. Leiner*)

Roentgen-Ray Diffraction of Sputum.—The presence of silica was shown in the sputa of persons with silicosis by roentgen-ray diffraction analysis. Positive roentgen diffraction identification of silica was obtained in the sputa of all 4 persons with severe silicosis. No evidence of silica was found in the sputa of 10 control patients. While the presence of silica has been previously demonstrated by roentgen diffraction in lung tissue obtained at autopsy, the present study appears to be the first report on the successful application of this method to sputum obtained during life. The method as used in this study was not quantitative. Considerable work will be required to determine whether roentgen diffraction of sputum has a place in the clinical diagnosis and investigation of silicosis (Authors' summary).—*X-ray diffraction study of sputum in silicosis, F. Meyer & S. Solomon, Arch. Indust. Hyg. & Occup. Med., November, 1951, 4: 443.*—(*T. H. Noehren*)

PUBLIC HEALTH AND EPIDEMIOLOGY

Occupational Tuberculosis.—Pre-employment and periodic chest roentgenograms of all employees in the Tuberculosis Division of Grasslands Hospital was introduced in 1932. Tuberculin testing was made compulsory in 1941. In 1938, periodic chest ro-

entgenograms were instituted for employees throughout the hospital and since 1941, chest films have been obtained on patients admitted to the hospital for conditions other than tuberculosis. Since 1932, among 7,901 persons, 78 were found to have active tuberculosis during employment and while under observation. Of these cases, 65 developed in a group of 3,486 employees with 9,750 exposure years, a rate of 0.66 per 100 per year; and 13 developed in a group of 4,415 without known exposure, a rate of 0.13 per 100 per year. The closer the contact with the patient, the greater was the danger of developing tuberculosis. Tuberculosis as an occupational hazard may be reduced by adequate case finding, isolation of infectious cases, the use of sound protective measures for workers in close contact with infectious patients, and BCG vaccination of tuberculin-negative employees.—*Occupational tuberculosis in hospital and sanatorium personnel, W. G. Childress, J.A.M.A., July 28, 1951, 146: 1188.—(H. Abeles)*

Tuberculosis Epidemic.—A class of 30 girls in a Paris suburban school had 7 reactors to tuberculin in 1949. Six months later, new conversions were detected and within the next three or four months all 30 children had a positive tuberculin test. Of these, 11 had abnormal roentgenologic findings and marked clinical symptoms. One of the students, aged 12, was found to have extensive involvement of one lung with cavitation and positive sputum. This child was considered to be the source case, since no tuberculosis was discovered among the school personnel. The other 10 girls had roentgenologic evidence of active primary tuberculosis. One patient also had erythema nodosum. Three of the contacts subsequently showed progressive disease: one developed miliary tuberculosis; another, extension of the pulmonary focus, with positive sputum; a third had pleurisy. The source case had progressive disease in spite of streptomycin, pneumothorax, and resectional surgery.—*Une épidémie de tuberculose dans un milieu scolarie, A. Besancon & Rollin, Rev. de la tuberc., 1951, 15: 608.—(V. Leites)*

Screening for Chest Pathology.—In a 70 mm. film chest roentgenographic survey of 156,724 persons, 307 showed findings suggestive of chest malignancy. Follow-up of these suspects led to the finding of 14 proved cases; 13 were in the age group of 45 years and over. In a follow-up of 217 suspected cardiac patients, as determined from 70 mm. chest roentgenograms of 43,202 persons, the authors found 74 cases of heart disease, as determined from 76 complete reports received in answer to questionnaires. In 10 per cent of the cases, the pathologic process discovered was previously unknown to the patient's physician. Chest roentgenographic screening is the only hope at present of picking up early cases of primary lung cancer. It is necessary that we expand our coverage if we are to find enough of these cases to affect the death rate significantly. Our final potentiality in using this method of detection has not been settled, and we should continue follow-up studies until the question has been answered. More consideration should be given to screening the most productive age groups, rather than all age groups. The actual value of finding the many miscellaneous types of pathologic processes in chest surveys should be determined as nearly as possible. Reports to physicians of evidences of cardiac enlargement appear to result in the discovery of a satisfactory number of unknown cardiovascular cases (Author's summary).—*Screening for chest pathology using mass X-ray survey technic, G. H. Gowen & B. Frank, Ann. Int. Med., January, 1952, 36: 138.—(T. H. Noehren)*

Beryllium Poisoning.—Beryllium poisoning causes systemic involvement, rather than merely a pulmonary lesion. It has been demonstrated that eczematous, contact dermatitis in beryllium workers is a hypersensitization phenomenon; the acute pulmonary changes may also be allergic. Research in this country and in Great Britain suggests that beryllium has an inhibitory effect on

alkaline phosphatases. The hypothesis that beryllium may compete for magnesium in magnesium-activated enzymes may explain its toxic properties. Further knowledge of this occupational disease may give clues to the body's reactions in the large group of granulomatous diseases. Many treatments have been employed but no specific antidote has been found. Corticotropin and cortisone therapy have given symptomatic benefits and have produced some regression in patients with chronic and progressive granulomatous beryllosis. A remarkable reduction in the incidence of beryllium poisoning has occurred since the institution of safety engineering and industrial hygiene in the industries involved.—*Current concepts of beryllium poisoning, H. S. Van Ordstrand, Ann. Int. Med., December, 1951, 35: 1203.*—(*T. H. Noehren*)

Platinosis.—Platinosis may be broadly defined as the effects of soluble platinum salts on people exposed to them occupationally. It has long been known that liquid sprays and splashes of salts containing the complex platinum ion cause severe dermatitis and/or asthma in many of the exposed employees. Patients of this type may be completely asymptomatic. Of the symptomatic type, there may either be predominantly dermatitis or respiratory distress, or a mixture of both. In the respiratory group there may be mild symptoms of sneezing, coryza, lacrimation, and burning of the eyes, or moderately severe symptoms of dry cough, tightness in the chest, progressive even to a full-fledged bronchial asthmatic syndrome. Chest roentgenograms were taken routinely every year on all employees within a platinum laboratory and refinery. In a group of 21 cases, the following changes were noted: 4 employees (19 per cent) revealed emphysema; 12 (57 per cent), thickening of the hilar areas; 16 (76 per cent), increased bronchovascular markings; one (5 per cent), an enlarged cardiac pulmonic conus; and 2 (10 per cent), diffuse pulmonary fibrosis. It may be suspected, but is difficult to confirm, that platinosis produces low-grade pulmonary fibrosis, due to chronic irritation of the entire respiratory tract. No carcinogenic activity has been attributed to the complex salts of platinum, nor has pulmonary tuberculosis been observed. Necropsy studies are, and probably will long remain, unavailable for pathologic diagnosis.—*Platinosis, a five-year study of the effects of soluble platinum salts on employees in a platinum laboratory and refinery, A. E. Roberts, Arch. Indust. Hyg. & Occup. Med., December, 1951, 4: 549.*—(*T. H. Noehren*)

Platinum Salt Allergy.—Three typical cases of bronchial asthma and urticaria were caused by ammonium chloroplatinate. Symptoms included edema of the eyelids, photophobia, rhinitis, asthmatic seizures, chest pain, and urticaria of the exposed skin. Eosinophilia was demonstrated. The skin test was positive with the solution of the agent but negative with the precipitated salt. Close collaboration between physicians, toxicologists, chemists, physicists, and employers is necessary whenever a new occupational disease shows up.—*Asthma bronchiale und allergische Hauterscheinungen, verursacht durch komplexe Platinsalze—eine neue Berufskrankheit, A. Jordi, Schweiz. med. Wchnschr., November 17, 1951, No. 46: 1117.*—(*E. Dunner*)

THE AMERICAN REVIEW OF TUBERCULOSIS

ABSTRACTS

Edited by LAWRENCE B. HOBSON

VOLUME 66 AUGUST, 1952 ABST. NO. 2

CLINICAL STUDIES, TUBERCULOSIS

Reliability of Reading Serial Films.—In this study an attempt is made to assess the realiability of estimates of change in serial postero-anterior roentgenograms of the chest. A set of one hundred and fifty 14- by 17-inch film pairs taken three months apart were interpreted independently twice by each of 3 radiologists and 3 phthisiologists of considerable experience in their respective fields. The following findings were obtained: (*1*) In judging a pair of films for evidence of progression, regression, or stability of disease, 2 readers are likely to disagree with each other in almost one-third of the cases, and a single reader is likely to contradict himself in approximately one-fifth of the cases. (*2*) A significant but relatively small part of the error in interpretation results from variations in technical factors in the 2 films. (*3*) The major reason for disagreements in serial film interpretation is not due to film pairs in which contradictory evidence is produced by the 2 lungs; a reader disagrees with himself or with another reader almost as much in evaluating changes in unilateral as in bilateral lesions. (*4*) When a reader judges the second film of a pair as being either "better" or "worse," the chances are that in approximately 10 per cent of the cases another reader will use the opposite classification; and the same reader is likely to reverse his own original diagnosis in approximately 7 per cent of the interpretations of the same pairs. Roentgenograms are still the most dependable single piece of evidence in chronic pulmonary disease. The dynamic status of pulmonary lesions cannot be determined, however, without other clinical or laboratory studies in addition to the comparison of serial chest roentgenograms. Serial examination of the chest should not be limited to single postero-anterior films. It is desirable that work be continued on the factors which influence errors in film interpretation, including the elements of personal training and ability, technique, terminology, and description.—*Studies on the value of serial films in estimating the progress of pulmonary disease, L. H. Garland, E. R. Miller, H. B. Zwerling, J. T. Harkness, H. C. Hinshaw, S. J. Shipman, & J. Yerushalmy, Radiology, February, 1952, 58: 161.*—(*W. J. Steininger*)

Silico-Tuberculosis.—Among 41 patients with silico-tuberculosis, 39 had tuberculosis superimposed on a pre-existing silicosis. The acute form of tuberculosis observed in 19 of the patients was thought to be the result of the erosion of a bronchial lymph node into the bronchus. Early findings included asymmetrical extension of lesions, tubercle bacilli in sputum, and increased sedimentation rate. The prognosis was poor, only 4 of the 41 patients being able to return to part-time employment. Streptomycin was administered to 12 patients. Despite the frequent occurrence of improvement, this was only temporary. In only one patient was sputum reported to have become negative for tubercle bacilli. — *Siliko-Tuberkulose, J. Steiger, Schweiz. Ztschr. Tuberk., 1951, No. 4: 310.*—(*E. Dunner*)

Treatment of Tuberculosis in Holland.—By geographic necessity the altitude cure has never been practiced in Holland. The basic and often the definitive treatment throughout the Netherlands is strict bed rest. This is maintained until the sputum has been negative on culture for at least three months and the lesion shows no sign of activity. Then follows a two- to four-month period of gradual mobilization. This is followed when possible by a "work cure," with slowly increasing increments of working

time under a sheltered environment. The average duration of treatment may thus reach eighteen to twenty months. The success of such conservative treatment has entirely condemned the early use of pneumothorax, which is not only ineffectual in many instances of fresh disease but carries the hazard of further spread, empyema, and ultimate impairment of function. Except in desperate cases, no active treatment whatsoever is employed until signs of activity such as fever and elevated blood sedimentation rate have abated. The use of pneumothorax in all types of tuberculosis has decreased so that now there are only 20 or 30 patients receiving it in a sanatorium of 400 to 500 beds; whereas, formerly there were 100. The treatment when used is rarely continued for more than two years. *p*-Aminosalicylic acid is now used in nearly all patients. Streptomycin, usually 1 gm. a day, is employed for short periods only and usually as an adjunct to surgical procedures. The newer drugs, viomycin and neomycin, are used only experimentally. There have been many advances in excisional surgery. Preoperative and postoperative care are stressed, and operation is always followed by several months of bed rest. Phrenic nerve exeresis and alcoholization have been largely abandoned because of the physiological evidence of permanently impaired function. Thoracoplasty and extrapleural pneumothorax have been largely supplanted by the excisional procedures but still have a place, particularly for patients with little respiratory reserve.—*Le développement du traitement de la tuberculose aux Pays-Bas surtout depuis 1935, R. L. Baart de la Faille, Poumon, January, 1952, 8: 15.—(F. S. Lansdown)*

ACTH and Tuberculosis.—A 58-year-old man had a normal chest roentgenogram on the day corticotropin (ACTH) and cortisone treatment for rheumatoid arthritis was started. Two months later, an extensive pneumonic lesion was found in the right upper lung field. The patient died; and, at autopsy, bilateral caseocavernous tuberculosis and confluent tuberculous pneumonia were found. Additional findings were rheumatoid arthritis and hepatic cirrhosis.—*Development of active pulmonary tuberculosis during ACTH and cortisone therapy, L. Fred, M. H. Levin, J. B. Rivo, & T. F. Barrett, J.A.M.A., September 15, 1951, 147: 242.—(H. Abeles)*

Cortisone and Tuberculosis.—A 64-year-old woman with apparently arrested pulmonary tuberculosis received cortisone treatment for arthritis. After the patient had received 4 gm. of cortisone, definite reactivation of the tuberculous lesion was found. Tubercle bacilli were demonstrated in the patient's sputum, and the chest film showed cavity formation.—*Cortisone and pulmonary tuberculosis, C. G. Popp, P. Ottosen, & C. A. Brasher, J.A.M.A., September 15, 1951, 147: 241.—(H. Abeles)*

Cortisone and Tuberculosis.—A 39-year-old woman received cortisone treatment for rheumatoid arthritis. Three months prior to institution of cortisone therapy, no abnormal findings were noted on roentgenographic examination. Six months after cortisone treatment had been started, there was an extensive infiltration in the right lower lung field. The patient's course was rapidly downhill, and she died with extensive caseocavernous lesions in the lung. Tubercle bacilli were not demonstrated while the patient was living, nor was an autopsy performed. The clinical and roentgenologic findings favored a diagnosis of progressive pulmonary tuberculosis.—*Tuberculosis following cortisone therapy: Report of a case of rapidly progressive pulmonary tuberculosis following cortisone therapy for rheumatoid arthritis, E. Q. King, J. B. Johnson, G. S. Batten, & W. L. Henry, J.A.M.A., September 15, 1951, 147: 238.—(H. Abeles)*

Peritoneoscopy in Tuberculosis.—Peritoneoscopic examination may prove valuable in tuberculosis, either to confirm a clinical diagnosis or to elucidate an obscure condition, especially unsuspected lesions causing few or no symptoms. The method was used in

100 patients with pulmonary tuberculosis who were treated with pneumoperitoneum. No complications developed. Three cases of intestinal tuberculosis were discovered, one of them completely asymptomatic and another suspected. Among the 25 women in the group, one case of localized genital tuberculosis amenable to surgical treatment was found. The presence of ascites is not a contraindication, but prior to peritoneoscopy any fluid present has to be removed. The left paraumbilical area is excellent for the insertion of the instrument.—*Peritonioscopia, J. M. Castello Branco & S. Rubens Barbosa, Clin. tisiol., October–December, 1951, 6: 451.*—(*A. A. Moll*)

Hemothorax in Artificial Pneumothorax.—Hemothorax in artificial pneumothorax is rarely fatal. It may, however, result in an early obliterative pleuritis. There was only one instance of substantial hemothorax in 10,600 refills. The condition is probably more common than this figure indicates, as lesser amounts of blood are often overlooked. The etiology is most often trauma to a lateral branch of the internal mammary artery. Less commonly, it is due to rupture of adhesions or injury to intercostal or intrapulmonary vessels. The treatment is usually simple aspiration. If the clotted blood cannot pass through a needle, it should be aspirated through a thoracoscopy cannula. Streptokinase has been used by some workers with success.—*Haemothorax during artificial-pneumothorax refills, W. E. Mashiter, Lancet, January 26, 1952, 1: 189.*—(*A. G. Cohen*)

Segmental Resection for Tuberculosis.—Among 273 cases of resection for pulmonary tuberculosis, 12 operations were performed before streptomycin had become available; and, of these patients, 8 died immediately postoperatively. Among the 261 cases protected by streptomycin and *p*-aminosalicylic acid, there was an operative mortality of 3 per cent (pneumonectomy, 8.2 per cent; lobectomy, 2.2 per cent; segmental resection, none). The only important complication was bronchopleural fistula, of which there were 6 among the 67 pneumonectomies and 6 among the 144 lobectomies. None occurred after segmental resection. Of the 44 pneumonectomy and lobectomy cases which were followed for more than two years, one died of myocardial infarction and one after an operation for bronchopleural fistula. Three patients continue to expectorate a few tubercle bacilli; the other 39 patients are apparently cured. Indications for resection include "destroyed lung," tuberculous bronchostenosis, tuberculous bronchiectasis, and the indolent type of disease with recurrent cavity or sputum positive for tubercle bacilli which has not responded to conservative treatment. The author is performing an increasing number of segmental resections. The present indications for this type of operation are (*1*) localized tuberculous foci with cavity, (*2*) tuberculomas, (*3*) localized tuberculous bronchiectasis, and (*4*) localized indurated foci with positive sputum. The patients subjected to segmental resection have not been followed long enough for full evaluation. Resection should be performed when the condition cannot be cured with strict bed rest and at the moment when the patient is in the best possible condition. Tuberculosis is a generalized disease and one cannot hope to eradicate all foci of infection; the aim of surgery is to extirpate only those regions which are the seat of tuberculosis incurable by conservative means and which offer a threat of dissemination. Operation is always preceded by months of strict bed rest. Respiratory exercises are learned prior to operation and practiced postoperatively. After approximately three weeks in the hospital, the patient is returned to the sanatorium for at least six months further bed rest in order to ensure healing of the remaining tuberculous foci.—*Les exérèses segmentaires en tuberculose pulmonaire, J. F. Nuboer, Poumon, January, 1952, 8: 42.*—(*F. S. Lansdown*)

Reactivation After Resection.—In the earlier series of lobectomies for tuberculosis, before the days of streptomycin and *p*-amino-

salicylic acid, there were many cases of recrudescence in the remaining lobe. Many of these were in the early postoperative period. Since the use of chemotherapy, such early recrudescences have dropped to 3 or 4 per cent and so are thought to have been due to dissemination during manipulation. If overdistention of the remaining lung tissue were a factor, one would expect a large percentage of reactivation more than a year after resection. There is little evidence that this is so. On the other hand, there are instances of healing of visible foci remaining after the largest lesion has been extirpated.—*La tuberculose des parties restantes d'un poumon est-elle guérie ou activée par la résection d'une partie tuberculeuse du même poumon?, R. L. Baart de la Faille & P. J. A. van Voorst Vader, Poumon, January, 1952, 8: 79.*—(*F. S. Lansdown*)

Bronchial Fistulas After Resection.—In a series of 112 lung resections for pulmonary tuberculosis, 23 bronchial fistulas (20 per cent) were observed. Fistulas appeared after all types of lung resection as sequelae of pyothorax, isolated cavities, and residual cavities after thoracoplasty. Diffuse active lesions with a high sedimentation rate more frequently occurred than other lesions. All patients who developed fistulas had had tubercle bacilli in their sputum; all had received large doses of streptomycin at least preoperatively. The condition of the bronchus seemed to have little effect upon the development of fistulas. Some appeared immediately, others became evident ten to fifteen days after operation, and others after several months. Some resulted from bronchial sutures which did not hold and occurred within the immediate postoperative period. Others had an indefinite cause and appeared later. Two factors created belated opening of a healed bronchial stump: (*1*) tuberculous lesions in the bronchial stump, and (*2*) more frequently, a purulent pleural effusion tracking toward the sectioned bronchus. The clinical manifestations varied with the size of the fistula. The two main symptoms were expectoration and the escape of air through the fistula. Fistulas seldom closed spontaneously, particularly when they were large; various operative methods were tried without much success. The authors had 95 successes after 12 operations on 6 patients. The prognosis was comparatively favorable for small fistulas, particularly when a considerable quantity of lung remained. Fistulas of the main bronchus following total pneumonectomy were serious. —*The surgical treatment of bronchial fistulas after lung resection for pulmonary tuberculosis, O. Monod, A. Babon, & J. Lo, Thorax, December, 1951, 6: 397.*—(*A. G. Cohen*)

Chronic Abscesses and Sinuses of Chest Wall.—In dealing with chronic abscesses and sinuses of the chest wall, emphasis should be placed on the treatment of the costal chondritis and sternal osteomyelitis usually associated. In 8 of 9 illustrative cases, the lesion was apparently tuberculous; in several instances, tuberculous mediastinal lymph nodes were excised. Lymphadenitis is probably the usual primary focus of infection in these tuberculous cases. In one case the infection was pyogenic and secondary to drainage of a subdiaphragmatic abscess. Costal chondritis must be treated by excision of all cartilage, infected or not infected, which has been exposed in the contaminated operative field. Sternal osteomyelitis may be treated less radically than chondritis; that is, by resection limited to bone involved by the infection. If careful excision of all infected soft tissue accompanies such treatment, primary closure of the wound may usually be used. Antibiotics are adjuncts to operative treatment of these abscesses and sinuses but are not substitutes for surgery. Healing has been obtained in all cases of the group. A longer follow-up period will be necessary to establish the permanence of the initial gratifying results.—*Chronic abscesses and sinuses of the chest wall: The treatment of costal chondritis and sternal osteomyelitis, R. B. Brown & J. Trenton, Ann. Surg., January, 1952, 135: 44.*—(*M. J. Small*)

Rheumatic Nodules in Tuberculosis.—

The hearts of 63 patients who died from tuberculosis were examined. In 13 there were granulomatous lesions in the myocardium; 7 of the lesions were identical with Aschoff bodies. There were no gross anatomical signs of latent, healed, or active rheumatic heart disease in any of these patients. These observations suggest that rheumatic nodules are allergic phenomena due to various allergens rather than the specific response to a specific agent.—*Rheumatic nodules in tuberculosis, A. Valdés-Dapena & M. Valdés-Dapena, J.A.M.A., August 25, 1951, 146: 1566.*—(*H. Abeles*)

CLINICAL STUDIES, NONTUBERCULOUS DISEASES

Mononuclear Pneumonia in Infants Dying Suddenly.—The pathologic findings in 76 infants who died without warning or after a brief period of prodromal symptoms were strikingly uniform. Infants who survived more than twelve hours after admission to a hospital or in whom autopsy revealed another significant lesion, such as congenital heart disease, were excluded from the series. The lungs were voluminous and moderately firm; their aeration was diffusely reduced although completely airless areas were rare. On section the involved tissue was red and moist, with frothy fluid exuding from it. Grossly, it resembled pulmonary edema. Microscopically, these involved areas, varying from groups of a few lobules to a whole lung, had a uniform appearance. Unaffected lung tissue usually was scant or absent; when present, it contained thin alveolar walls, good or excessive aeration, and often intra-alveolar or interstitial emphysema. Diseased tissue was sharply demarcated from the normal portions and contained areas with different degrees of aeration and expansion. In such areas, the alveolar walls were thickened and there was exudate in the lumina. Usually a few alveoli were aerated, the majority being expanded with fluid; less commonly, the majority of the thick-walled alveoli were aerated. The thickened alveolar walls had an increased amount of connective tissue and a scant infiltration with cells, mostly lymphocytes with occasional large mononuclear cells. The alveolar exudate stained homogeneously and contained polygonal or oval cells which were somewhat larger or smaller than the macrophages commonly seen in the lungs. These cells rarely contained vacuoles or granules suggesting phagocytosed material. The walls of the bronchi were usually intact and sometimes were moderately infiltrated with lymphocytes. Less characteristic findings in other organs included hyperplasia of lymphoid tissue in the intestinal wall, mesenteric nodes, and spleen. Although the clinical course and pathologic findings suggested an infectious disease, stains for microorganisms were usually negative. The causative agent may be a virus but no proof of this was available. This condition must be differentiated from suffocation or status thymicolymphaticus, the diagnosis at first made in some of these cases.—*Mononuclear pneumonia in sudden death or rapidly fatal illness in infants, P. Grunewald & M. Jacobi, J. Pediat., December, 1951, 39: 650.*—(*M. J. Small*)

Atypical Pneumonia.—An explosive outbreak of atypical pneumonia occurred at an Army Hospital in Kobe, Japan, affecting 45 patients, 38 men, and 7 women. Fever, chest pain, chilly sensations, and malaise were the most frequent symptoms. Stiffness of the neck was noted by one-fourth of the patients. A maculopapular eruption occurred in 9 cases. The roentgenographic findings varied from small patches to extensive hazy densities in the lungs. Chest reontgenograms became normal within ten days in only 14 patients; in 10 patients abnormalities persisted for three to four weeks. The duration of the febrile period was the same whether the patients received penicillin, penicillin and aureomycin, or no antibiotic therapy. Administration of penicillin and aureomycin did not prevent the disease. One patient developed a pleural effusion. During the acute phase the total leukocyte and differential counts were usually normal; later there was a tendency to lymphocytosis and eosino-

philia. Abnormal cephalin-cholesterol flocculations were found in 18 of 36 patients for whom the test was done. Bacteriologic studies were unsuccessful. No viral or rickettsial agent could be isolated. Cold agglutination tests, complement-fixation tests for psittacosis, lymphogranuloma venereum and Q fever, influenzal hemagglutination-inhibition studies, and Weil-Felix reactions were all negative. The disease was called "K-8 fever," after Kobe Eighth Station Hospital.—*Explosive outbreak of an atypical pneumonia ("K-8 fever"), P. Troen, A. M. A. Arch. Int. Med., February, 1952, 89: 258.—(G. C. Leiner)*

Hemolytic Anemia in Viral Pneumonia.—A 46-year-old Negro man with viral pneumonia and hemolytic anemia was seen. Cold agglutinins were present in dilutions to 1:4096. Positive serologic reactions and an increased heterophile-agglutination titer were probably coincidental findings.—*Hemolytic anemia in viral pneumonia with high cold-agglutinin titer, R. S. Aaron, A. M. A. Arch. Int. Med., February, 1952, 89: 297.—(G. C. Leiner).*

Hodgkin's Disease.—Cardiac involvement in Hodgkin's disease is rare. Among 63 autopsies of cases with Hodgkin's disease, only 5 disclosed cardiac involvement. One patient, a 34-year-old woman, had generalized Hodgkin's disease with involvement of the right auricle obstructing the inferior vena cava and tricuspid orifice.—*Cardiac involvement in Hodgkin's disease, A. Rothino & G. T. Hoffmann, Am. Heart J., January, 1952, 43: 115.—(G. C. Leiner)*

EKG in Pneumoperitoneum.—With marked elevation of the diaphragm, as in pneumoperitoneum, deep but reversible Q waves may appear in lead AVF even though the patient has no cardiac disease. Concomitant changes are seen in the esophageal leads; there is a marked lowering of the auricular and transitional zones to levels usually considered ventricular. The Q waves normally present at the auricular and transitional levels are thereby oriented toward the left leg, resulting in a Q_{AVF} (Authors' summary).—*Positional changes in Q_{AVF} and the esophageal leads induced by pneumoperitoneum, I. J. Rubin & W. Most, Am. Heart J., February, 1952, 43: 236.—(G. C. Leiner)*

Tension Pneumothorax Following Tracheotomy.—Of 2 cases of tension pneumothorax following tracheotomy, one proved fatal. A neck wound such as a tracheotomy involves the pretracheal fascia. If respiratory obstruction occurs, as when the tracheotomy tube slips out of the previously obstructed air passage, violent respiratory efforts ensue. Air is sucked into the wound and down into the mediastinum where it is trapped. Eventually, the air breaks out into one or both of the pleural cavities.—*Tension pneumothorax following tracheotomy, J. F. Dark, Lancet, February 23, 1952, 1: 398.—(A. G. Cohen)*

Diaphragmatico-Pericardial Hernia.—Diaphragmatic hernias are receiving increasing attention because they may be amenable to corrective surgery. Very rarely are diaphragmatic hernias encountered with displacement of hernial contents into the pericardial sac with a resultant diaphragmatico-pericardial or peritoneopericardial hernia. In fact only 9 such instances have been previously recorded in the literature. An additional case occurred in a 50-year-old woman with severe kyphoscoliosis who was hospitalized with a diagnosis of cardiac failure. Cardiac symptoms had developed during the eight months prior to hospitalization. Chest roentgenograms suggested a diaphragmatic hernia, and a barium enema examination showed that a coil of large intestine was situated within the parietal sheath of the pericardium. At operation, the transverse colon was found to be herniated through a defect situated anteriorly in the diaphragm just behind the xiphoid process. The defect in the diaphragm had the appearance of an oval slit measuring approximately 4 cm. in the transverse direction and 1.5 cm. in the sagittal direction. The posterior and lateral margins were thickened

and firm. Repair of this defect was accomplished. Roentgenographic examination shortly after operation showed some air within the pericardium and complete reduction of the herniated intestine. Follow-up studies more than fourteen months later showed no evidence of recurrence.—*Hernia diaphragmatica pericardialis, E. Astrup & E. Ziesler, Acta med. Scandinav., 1951, 141: 153.—(K. T. Bird)*

Pulmonary Agenesia.—A sixteen-year-old patient had been admitted to a tuberculosis sanatorium and treated for a year with streptomycin and *p*-aminosalicylic acid. After discharge, recurrence of the previous symptoms led to re-evaluation. The history and clinical evidence suggested the presence of a congenital pulmonary defect. Bronchography disclosed only a rudimentary right bronchus covered at its end by a fibrocartilaginous mass and confirmed the diagnosis of pulmonary agenesia.—*Sobre a agenesia pulmonar, S. Rubens Barbosa, Clin. tisiol., July-September, 1951, 6: 357.—(A. A. Moll)*

Major Surgery in Patients with Healed Myocardial Infarction.—Evidence of healed myocardial infarction is not a contraindication per se to adequate surgical care of cancer. A total of 58 such patients were operated upon with a mortality rate of 5.2 per cent; 24 per cent developed postoperative cardiorespiratory complications. The incidence of cardiorespiratory complications apparently was greater in patients who had cardiac enlargement but seemingly was unrelated to sex, age, cardiac classification (1A to 3C), age of infarct, angina, or hypertension. The longer the surgical procedure, the greater the complication rate became. Pentothal anesthesia was associated with a 43 per cent incidence of cardiorespiratory complications. Such patients tolerate moderate amounts of whole blood and intravenous fluids surprisingly well. The adequate surgical care of cancer in a patient who has a healed myococardial infarct does not appear to affect adversely the existing heart disease. Fourteen of these patients were alive two or more years after their operations and 16 survived one or more years (Authors' summary).—*Major surgery in patients with healed mycocardial infection, C. A. Hannigan, F. Wroblewski, W. H. Lewis, Jr., & J. S. LaDue, Am. J. M. Sc., December, 1951, 222: 628.—(W. J. Steininger)*

Mediastinal Lymphadenopathy in Bronchial Carcinoma.—Roentgenography of the barium-filled esophagus has proved a useful procedure in diagnosing lesions of the lungs, pleura, and mediastinum. Demonstration of esophageal compression and displacement, usually best seen in the left anterior oblique view, is of special value for the recognition of enlargement of the mediastinal lymph nodes lying within the angle produced by the bifurcation of the trachea, the so-called bifurcation nodes, which may not be demonstrable otherwise. Enlargement of the bifurcation nodes may be either inflammatory or neoplastic. Such enlargement is especially characteristic of bronchial carcinoma and its demonstration in association with chronic pulmonary consolidation is highly suggestive of that diagnosis. It is significant also from the point of view of prognosis and treatment, since it is indicative of carcinomatous spread to the mediastinum.—*The esophagus and mediastinal lymphadenopathy in bronchial carcinoma, F. G. Fleischner, Radiology, January, 1952, 58: 48.—(W. J. Steininger).*

Alveolar Cell Cancer.—Among 33 histologically proved cases of terminal bronchial cancer, the average age of the patients was 55.6 years and one-fourth of them were women. Pain and cough were the commonest symptoms. Bloody sputum was noted in 9 patients. In 15 per cent the disease was asymptomatic. In 22 patients the diagnosis was made clinically with the aid of various diagnostic procedures, such as cytological studies, aspiration biopsy, thoracotomy, and biopsy of peripheral lymph nodes. The commonest roentgenographic finding was a single, peripherally located, circular area of increased density. Radiation as a primary means

of treatment seems to have little value. Of 16 patients who received definitive surgical therapy, 10 are living and 2 of these are alive and well more than five years after excision. Pathologic examination demonstrated the nodular form in 23 cases and the diffuse form in 10 cases. Metastases were demonstrated in 25 cases.—*Terminal bronchiolar or 'alveolar cell' cancer of the lung: Report of thirty-three cases, W. L. Watson & R. R. Smith, J.A.M.A., September 1, 1951, 147: 7.—(H. Abeles)*

Pulmonary Adenomatosis.—Two cases of pulmonary adenomatosis, confirmed by autopsy, are added to the 74 described in the literature. Nodular and diffuse types of the disease are generally recognized, but actually the fundamental radiographic picture is always nodular, although the nodules may coalesce to form diffuse areas or be masked by atelectasis or pneumonitis. In these instances, nodulation will nearly always be evident at the periphery of the diffuse process. It is believed that pulmonary adenomatosis should be considered malignant, since it is invariably fatal and since 50 per cent of the cases show distant metastases.—*Pulmonary adenomatosis (alveolar-cell tumors), R. W. Lackey, Radiology, February, 1952, 58: 215.—(W. J. Steininger).*

Calcification in Pulmonary Coin Lesions.—Demonstration of calcification within a pulmonary "coin" lesion may be considered as strong evidence that the lesion is not malignant. For this reason one should make every effort to detect the presence of calcification in all coin lesions, using sectional radiography routinely. By this means, information is easily obtainable which may justify periodic supervision rather than immediate excision of accidentally discovered "coin" lesions in patients who represent increased operative risks. In 13 cases of pulmonary coin lesions with calcification, no evidence of malignant growth was demonstrated either by operation (5 cases) or by prolonged observation (8 cases).—*The significance of calcification in pulmonary coin lesions, H. Abeles & A. D. Chaves, Radiology, February, 1952, 58: 199.—(W. J. Steininger)*

Effusion Simulating Mediastinal Tumor.—Of 2 cases of encapsulated paramediastinal pleural effusion simulating mediastinal tumor, one was proved to be due to tuberculosis; the cause of the other was not determined. One patient was subsequently subjected to thoracotomy on the side of the previous effusion. No mediastinal mass was present; the former site of the encapsulated effusion was marked only by broad bands of adhesions. The patient who was not explored presented unmistakable roentgen evidence that the apparent tumor consisted merely of an encapsulated effusion. In addition to suggesting another entity which may closely simulate a mediastinal tumor, these 2 cases again serve to emphasize the extreme importance of reviewing all previous chest roentgenograms of patients presenting an abnormal intrathoracic mass.—*Encapsulated pleural effusions simulating mediastinal tumor, C. F. Storey, Radiology, March, 1952, 58: 408.—(W. J. Steininger)*

Surgery for Pulmonary Stenosis in Tetralogy of Fallot.—Patients with the tetralogy of Fallot have been operated upon, using a direct intracardiac approach to relieve the pulmonary stenosis instead of the well-known shunting procedure of Blalock and Taussig which by-passes the impediment to pulmonary flow. In this direct procedure, the right ventricle is opened and the stenosis relieved by a suitable knife, finger or sound, depending upon whether the stenosis is valvular or infundibular. Of 30 consecutive patients, 23 survived the operation with very satisfactory results. The over-all mortality rate was 23.3 per cent, the operative mortality rate being 20 per cent. It is believed that this direct procedure achieves more nearly physiologic results than the shunt procedures. In the latter, at least theoretically, a third circulatory defect is added to a system already burdened with two, an additional load is thrown on the left heart which must continually recirculate

a large portion of the left ventricular output. Anatomic data indicate that the susceptibility to subacute bacterial endocarditis should be greater following shunt procedures than after the direct approach.—*The direct surgical attack on pulmonary stenosis in the tetralogy of Fallot, D. F. Downing, C. G. Fischer, C. P. Bailey, R. P. Glover, & T. J. E. O'Neill, J. Pediat., December, 1951, 39: 645.*—(*M. J. Small*)

Chronic Constrictive Pericarditis.—In 8 of 20 cases of chronic constrictive pericarditis there was adequate evidence of a tuberculous etiology. There was an unusually concentrated and prolonged exposure to tuberculosis or tuberculosis was found in the pericardial scar or at other sites, such as bones, lymph nodes, or lungs. In the other 12 cases, evidence of a specific etiology was unobtainable. This need not mean that tuberculosis is not the cause in most, if not all, cases. In one case trauma may have been the main etiologic factor in the scarring of the pericardium. Cyanosis, impaired respiratory function, syncope, dilatation of the superior vena cava, lowered serum proteins, simulation of mitral stenosis, and a hepatic friction rub were some of the clinical manifestations of the disease. An adventitious sound in early diastole was present in at least half of the cases in this series. Of the 20 patients, 17 had at least one pericardectomy. Of the 15 who survived operation, 11 attained clinical cures, 3 were improved, and one unimproved. Every patient with incapacitating constrictive pericarditis, except elderly people with extensive calcification, should have a pericardectomy as soon as the diagnosis is established, active tuberculosis excluded or controlled with chemotherapy, and the patient in as good a physical condition as possible.—*Chronic constrictive pericarditis: I. Some clinical and laboratory observations, V. A. McKusick, Bull. Johns Hopkins Hosp., January, 1952, 90: 3.*—(*J. S. Woolley*)

Pulmonary Hypertension in Congenital Heart Disease.—Pulmonary hypertension is often encountered in the more common congenital heart defects with increased pulmonary blood flow (patent ductus arteriosus, interatrial septal defect, and interventricular septal defect). Hitherto, very few instances of pulmonary hypertension have been reported in patients with congenital heart disease other than those with: (*1*) coarctation of the aorta proximal to a patent ductus arteriosus; (*2*) persistent truncus arteriosis without pulmonary stenosis; (*3*) the Eisenmenger complex; (*4*) a single ventricle without pulmonary stenosis; (*5*) the Taussig-Bing complex; (*6*) tricuspid atresia without pulmonary stenosis. Heart catheterizations were performed on approximately 220 infants and children. The right ventricular and pulmonary artery pressures, the systemic pressure, the systemic and pulmonary flow, and left-to-right shunt were measured. From this group of patients with heterogeneous congenital heart lesions, 31 were found to have pulmonary hypertension. A breakdown of this group according to clinical anatomic diagnosis showed the following distribution: 9, patent ductus arteriosus; 9, interventricular defect; 5, interatrial defect; 4, aortic-pulmonary septal defect; 3, idiopathic hypertension; 1, Eisenmenger complex. In these patients, pulmonary hypertension was nearly always associated with mild to moderate cardiac disability. On the other hand, catheterization data obtained from the few patients with the diagnoses listed above, but lacking in symptoms, suggested that the absence of symptoms was usually accompanied by normal pulmonary artery pressures. In a few patients, lung biopsies were obtained during surgery or at post-mortem examination. The findings suggested that irreversible changes may take place in the pulmonary vessels and preclude relief of symptoms by surgical correction of anatomic defects.—*Pulmonary hypertension in children due to congenital heart disease, F. H. Adams, J. Pediat., January, 1952, 40: 42.*—(*M. J. Small*)

Anoxemia and Cyanosis.—Arterial oxygen saturation was studied in a series of 175 pa-

tients who exhibited dyspnea, tachycardia, unconsciousness, or cyanosis, which were regarded as signs of possible arterial anoxemia. In a group of patients with dark blue cyanosis and chronic congestive heart failure, a normal or nearly normal systemic arterial oxygen saturation was found. This dark blue cyanosis of congestive heart failure is easily seen by the clinician, is limited to certain areas, and is due to capillary oxygen unsaturation unrelated to systemic anoxemia. By contrast, the very important type of anoxemic or systemic cyanosis is difficult to discover by the naked eye. The actual degree of anoxemia is still more difficult to evaluate. This type of cyanosis is characterized by the diffuse leaden-gray color of the skin with a slight blue tint. The even distribution of the color makes it more difficult to detect. Anoxemic cyanosis is somewhat more marked in the finger tips and nail beds. In these locations stagnant cyanosis is common, but the color of the stagnant cyanosis is a darker blue, without the shade of gray. In this study the number of anoxemic patients and particularly the degree of anoxemia was unexpectedly large, as judged by clinical criteria, especially in patients with acute and chronic pulmonary disease. A syndrome of chronic high-grade anoxemia with pulmonary insufficiency is characterized by a stuporous or drowsy patient with a diffusely leaden-gray skin. Dyspnea is not striking. A low blood pressure and tachycardia are the most prominent clinical findings. In fact, the tachycardia may be a disconcerting and baffling sign until the low arterial oxygen saturation is discovered. Since anoxemic cyanosis is difficult to recognize and to evaluate by sight, biochemical or oximeter methods are needed in clinical practice to provide for rational oxygen therapy.—*Studies in oxygen therapy: I. On the frequency of anoxemia, its occurrence in medical diseases and its relation to cyanosis, H. Rasmussen & O. Storstein, Acta med. Scandinav., 1951, 141: 43.*—(*K. T. Bird*)

Oxygen Therapy.—The more important causes of arterial oxygen unsaturation include obstruction of the air passages, interference with the mechanical respiration, destruction of considerable amounts of lung tissue, and alteration in the alveolar membrane with impairment of the diffusion of oxygen into the pulmonary capillaries. The pulmonary causes are of greater importance than the circulatory. The effect of oxygen inhalation was studied by first determining the arterial oxygen saturation. Then, after the patient breathed pure oxygen through an oronasal mask for ten minutes at an oxygen flow of 22 to 24 liters per minute, a second arterial blood sample was drawn. In patients with a normal arterial oxygen capacity and normal arterial oxygen saturation, it was possible to increase the oxygen content of arterial blood as much as 2.5 volumes per cent; the average increase being 1.85 volumes per cent. This increase is brought about by the increased tension of oxygen in the alveolar air and the resultant increase of physically dissolved oxygen in the blood plasma. In various anemias with normal arterial blood saturation and reduced oxygen capacity, this increase in physically dissolved oxygen is of importance as the oxygen transport is increased by an average of 19 per cent. Apart from other therapeutic measures, oxygen therapy may be of considerable value in the treatment of severe anemias. In 135 patients with a normal or low oxygen capacity and a reduced arterial oxygen saturation treated with 100 per cent oxygen through a mask, it was possible to produce normal arterial oxygen saturation values in most cases regardless of the cause of anoxemia. This was not the case when veno-arterial shunts existed, although a considerable increase in arterial oxygen saturation was achieved. In 3 cases normal saturation was not obtained, although the anoxemia was considerably alleviated. Extensive pulmonary infiltration and severe anoxemia were factors in these cases. While it is obvious that the oxygen want in cases of severe anoxemia must be relieved, it is more difficult to ascertain to what extent the relief of a slight or moderate arterial oxygen unsaturation is of importance to the human

body. It appears certain, however, that the anoxemia ought to be relieved at a much earlier stage than the level of anoxemia which can be clinically diagnosed with certainty.—*Studies in oxygen therapy: II. On the effect of oxygen therapy on the oxygen unsaturation of the arterial blood, H. Rasmussen & O. Storstein, Acta med. Scandinav., 1951, 141: 52.*—(*K. T. Bird*)

Venous Pressure.—In venous pressure determinations there must be a common reference level to obtain comparable values of pressure measurements. For practical reasons the reference level ought to be at the level where the diastolic filling pressure ends and the systolic pressure arises, that is, on a level with the right auricle. There is, however, little agreement as to the position of the latter within the chest. The level within the right auricle from which the measurements are made is of subordinate importance, but the zero level must, as far as possible, pass through the same level in all patients regardless of the size of the chest. Lateral chest films were taken during cardiac catheterization in 18 patients. The center of the line joining the entrances of the two caval veins into the right auricle was, on the average, 0.43 times the anteroposterior diameter from the anterior surface of the chest. The mean deviation was only 3 per cent of the lateral thoracic diameter. Accordingly, one-half of the anteroposterior thoracic diameter, measured on a level with the fourth intercostal space anteriorly, is proposed as the reference level of venous pressure determinations in the supine position.—*Venous pressure measurement: I. Choice of zero level, A. Pedersen & J. Husby, Acta med. Scandinav., 1951, 141: 185.*—(*K. T. Bird*)

Radiotherapy for Bronchogenic Carcinoma.—Twelve proved cases of inoperable bronchogenic carcinoma received roentgen therapy administered by the multiple-port technique. The treatment fields were determined by means of the localizing protractor, which permits accurate localization of the tumor, accurate direction of the radiation beam, delivery of a cancericidal tumor dose, and maintenance of skin dose well below tolerance. In general, 7 to 8 portals were used, extending around the hemithorax. Daily tumor doses of 250 r were administered for five to six weeks. The average survival time of these patients following the onset of symptoms was 21.6 months; and following diagnosis, 16.0 months. The results of this small series suggest that the survival time is prolonged following high-dosage beam-directed radiotherapy.—*Beam-directed high-dosage radiotherapy of bronchogenic carcinoma, L. R. Felton, Radiology, January, 1952, 58: 43.*—(*W. J. Steininger*)

Methocel-Diodrast for Bronchography.—The roentgenographic and clinical results obtained with a new contrast medium, methocel-diodrast, were studied. Methocel-Diodrast is an aqueous solution of 50 per cent Diodrast and 1.75 per cent methylcellulose, a thickening agent. An intradermal skin test with 0.1 cc. of 35 per cent diodrast is made prior to the examination in an attempt to exclude sensitivity. The shadows of the bronchi remain sharp for three or four minutes after the instillation of methocel-diodrast. After longer intervals the outlines are blurred as the material is absorbed by the bronchial mucosa. Because of this rapid absorption, it may be advisable to do all filming with a spot film device. Normal lungs are clear radiographically of contrast medium one hour after the bronchogram has been completed. Pulmonary disease, such as bronchiectasis, causes a slight delay in absorption. Technically satisfactory bronchograms were obtained with Methocel-Diodrast in 19 of 23 cases, and the medium was considered preferable to the iodized oils. Mild febrile reactions (100°–101°F.) occurred in 9 cases, lasting one day. In 2 patients with active pulmonary tuberculosis the procedure was without adverse effect on the disease. In one instance, injection of 15 cc. of the medium into a pulmonary segment caused a pneumonia which cleared in eight days with antibiotic therapy. One death occurred during Methocel-Diodrast

bronchography, probably due to a cocaine reaction. Follow-up films of 9 patients revealed no changes which could be attributed to the medium. Further clinical trial is recommended.—*Methocel-Diodrast: A viscous water-soluble contrast medium for bronchography, E. Salzman, M. E. Peck, & A. J. Neerken, Radiology, February, 1952, 58: 209.—(W. J. Steininger)*

Tetracaine Reactions.—Topical anesthesia with 2 per cent tetracaine hydrochloride was used in 1,000 consecutive bronchoscopies. Preoperatively, the patient received demerol, 50 mg., and phenobarbital sodium, 130 mg. For most of the patients, tetracaine hydrochloride, 30 to 40 mg., was used in production of anesthesia. There were 7 severe reactions (0.7 per cent), 6 of the convulsive type and one of bronchospasm with status asthmaticus, and 12 minor reactions (1.2 per cent).—*Reaction to tetracaine (Pontocaine) used as topical anesthetic in bronchoscopy: Study of 1,000 cases, W. Weisel & R. A. Tella, J.A.M.A., September 15, 1951, 147: 218.—(H. Abeles)*

ANTIMICROBIAL THERAPY

Disseminated Tuberculosis. — Fifty patients with disseminated tuberculosis were treated with streptomycin alone in a dosage of 50 to 100 mg. per kg. of body weight given twice daily over a period of four to eight months. Intrathecal as well as intramuscular injections were given to 13 patients. The intrathecal dosage was 50 mg. of streptomycin daily for six weeks. The follow-up observation time ranged from fourteen to thirty-six months, averaging twenty-two months, after the termination of therapy. Of the 50 patients treated, 17 recovered. Four of the 6 patients with miliary tuberculosis alone recovered, 11 of 32 with tuberculous meningitis alone recovered, while 2 of the 12 with tuberculous meningitis and miliary tuberculosis recovered. Nine of 13 patients with tuberculous meningitis (all children) recovered without defect. Two, however, have hydrocephalus and mental defects.—*On streptomycin treatment of tuberculous meningitis and miliary tuberculosis, H. C. A. Lassen & F. Nuekirch, Acta med. Scandinav., Supplement 262, 1951, 140: 44.—(K. T. Bird)*

Treatment of Bone and Joint Tuberculosis.—No radical change has resulted from the use of the antibiotics in the treatment of bone and joint tuberculosis. Earlier and safer surgery is possible. Some cases are made amenable to surgery with the help of the antibiotics.—*Die Antibiotika in der Chirurgie der Knochen- und Gelenktuberkulose, A. Richard & J. Untereiner, Wien. klin. Wchnschr., January 26, 1952, 64: 67.—(G. C. Leiner)*

Streptomycin Resistance.—Titration of resistance to streptomycin can be carried out both on colony of tubercle bacilli and directly on sputum or other body products. Direct titration is of advantage in that: (*1*) It is less time-consuming so that results may become available in time to apply them clinically; and (*2*) it has helped our understanding of the nature of *in vivo* resistance in demonstrating that a given sample of sputum may contain bacilli of varying resistance. In the 175 cases studied, it was demonstrated that resistance may appear after two weeks of streptomycin therapy. After six weeks it had appeared in 26 per cent; and after longer periods, in 62 per cent. Bacilli showing the greatest resistance originate in most cases in pulmonary cavities. In certain instances it was possible to demonstrate resistant bacilli from the cavity and susceptible bacilli from another focus in the same patient. Bacilli resistant to 10 γ per ml. should be considered susceptible. Although increased resistance should certainly not be ignored, it need not be a definite contraindication to surgery. The present recommendation is to give streptomycin in short courses and in combination with *p*-aminosalicylic acid, which appears to delay the emergence of resistance.—*Résistance des bacilles tuberculeux à la streptomycine, H. Beeukes & H. Vos, Poumon, January, 1952, 8: 25.—(F. S. Lansdown)*

Amithiozone for Tuberculosis.—Amithiozone (TB I) was used in the treatment of 45 cases. Patients were selected who suffered from a type of disease for which streptomycin was not immediately indicated. The lesions were predominantly chronic bilateral fibrocaseous with some radiologic shadows which might be judged as likely to respond to an antibiotic. The drug was given orally, at first in graduated doses of 25 to 50 mg. daily up to an effective dose of 2 mg. per kg. of body weight to 250 mg. a day. A course of four months was prescribed and was completed by more than half of the patients; in the others, the drug was discontinued sooner because of complications or general deterioration. In 12 of 25 patients who received the drug for at least four months, there was roentgenographic improvement which might be attributable to the drug. The most frequent beneficial effect seemed to be on cavities. Improvement in general well-being, appetite, and weight appeared in some but was less marked than had been observed with the administration of *p*-aminosalicylic acid. Of 9 patients with laryngeal tuberculosis, 4 showed marked and 3 moderate improvement. Of 3 patients with endobronchitis, 2 were markedly improved. The toxic and side effects consisted of urinary changes, liver dysfunction, blood changes, and abdominal symptoms. Albuminuria without other signs of renal dysfunction was seen in 10 cases. It persisted for as long as two months after discontinuation. In one patient, there was a slight fall in serum proteins, and in 4 of 8, a slight alteration of the Takata-Ara reaction. No alterations in other tests were noted. In 3 patients secondary hypochromic anemia developed; the white blood cells were not affected. Mild abdominal symptoms appeared in 8 patients. With doses of not more than 200 mg. a day, the toxic effects were not serious if careful control was exercised.—*Thiosemicarbazone in chemotherapy of tuberculosis: Report by Research Committee of British Tuberculosis Association, Tubercle, October, 1951, 32: 217.*—(A. *G. Cohen*)

Activity of Thiosemicarbazones.—Twenty-one heterocyclic thiosemicarbazones were tested for antimycobacterial activity *in vitro* and *in vivo*. Large differences in activity attended small changes in chemical structure. The most promising compound, nicotinylthiosemicarbazone, inhibited the growth of a virulent human tubercle bacillus, H37Rv, in a concentration of 0.06 mg. per 100 ml. Varying degrees of activity were exhibited by 3 of 5 thiosemicarbazones which were tested in tuberculous mice. Striking protection was observed when nicotinylthiosemicarbazone was administered in the food for thirty days. All of 20 treated mice remained alive and well; only one showed gross evidence of tuberculosis at autopsy. An occasional tubercle bacillus was seen in the livers of the treated animals but none were found in the lungs, kidney, and spleen. Of the untreated controls, 18 died with advanced pulmonary tuberculosis and the 2 remaining animals showed severe involvement at autopsy. No signs of drug toxicity were noted. Nicotinylthiosemicarbazone appears to be more active than streptomycin *in vitro*, and is probably superior to amithiozone (TB I) and para-aminosalicylic acid *in vivo*. Further studies appear warranted.—*Studies in experimental tuberculosis: in vitro and in vivo activities of thiosemicarbazones, C. J. Duca, M. V. Rothlauf, & J. V. Scudi, Antibiotics, January, 1952, 2: 16.*—(*W. M. M. Kirby*)

Nisin for Tuberculosis.—Nisin is an antibiotic which is produced by a strain of *Streptococcus lactis*. Previous experiments had shown that it might be of value in the treatment of tuberculosis. *In vitro* experiments showed it to be less effective than penicillin against gram-positive organisms. Against *M. tuberculosis*, its activity was approximately equal to that of streptomycin. When administered intraperitoneally or orally to mice, it displayed no antituberculosis activity. In guinea pigs it was very difficult to maintain nontoxic blood serum levels high enough to suppress the growth of tubercle bacilli.—*Nisin in experimental tuberculosis,*

E. M. Bavin, A. S. Beach, R. Falconer, & R. Friedmann, Lancet, January 19, 1952, 1: 127.—(A. G. Cohen)

Intravenous PAS.—A total of 2,200 intravenous infusions of *p*-aminosalicylic acid (PAS) were administered to 71 patients, using Cocchi's method. A fresh, 20 per cent chemically pure sodium salt of PAS solution, at the most four days old, was diluted immediately before use with 300 to 500 cc. of pyrogen-free physiological saline solution. Brown discoloration of the solution indicated PAS deterioration. Heparin was not used but, toward the termination of the infusion, vitamins C and K were added. At the start, daily doses of 15 gm. were used; later, 20 to 40 gm. of PAS were administered. For prolonged therapy, a specially constructed fine needle with a flattened hub was introduced far into one of the superficial veins on the dorsum of the hand. The needle was connected by polythene tubing to a flask protected from sunlight. With proper application of the needle, the extremity was freely movable for the five to nine hours required for the solution to run in at a rate of 20 to 30 drops per minute. The treatment consisted of four to six infusions per week over a period of several months. Complications were occasional chills and thrombophlebitis. Despite the frequent obliteration of small, peripheral veins, extensive vascular reactions were rare even without the use of heparin. Mild gastrointestinal disturbances were manifested only when the infusion flowed in too rapidly. With prolonged therapy, many patients complained of adynamia which was possibly due to potassium deficiency. Drug fever occurred in 3 patients, with its onset between the tenth and twelfth day of administration. This was accompanied by urticaria in 2 patients, one of whom was diabetic. In 6 patients with complicating diabetes, the metabolism was not affected. In 2 instances, however, large intravenous PAS doses led to increased acetonuria. Indications for intravenous PAS were (*1*) severe forms of tuberculosis, such as miliary, meningeal, and caseous pneumonia; (*2*) streptomycin-resistant tubercle bacilli; (*3*) hematogenous spreads; (*4*) extensive, severely toxic, cavitary tuberculosis; (*5*) endobronchial tuberculosis; and (*6*) patients unable to tolerate oral PAS medication.—*Über Methodik und Komplicationen der intravenosen PAS-Infusionen, J. Regli & C. Stäubli, Schweiz. med. Wchnschr., December 29, 1951, No. 52: 1305.—(E. Dunner)*

PAS Toxicity.—The literature concerning side effects incidental to the treatment of tuberculosis with *p*-aminosalicylic acid (PAS) shows that these side effects may be divided into 2 groups. The symptoms of the first group are of less importance and are due mostly to changes in doses or mode of application. They consist of (*1*) gastric and intestinal disturbances; (*2*) renal irritation with albuminuria, increased amounts of erythrocytes and leukocytes in the sediment, and hematuria; (*3*) lengthening of the prothrombin time, due to adverse effects of the PAS on vitamin K; and (*4*) an increased number of leukocytes in the blood stream, especially of neutrophils and monocytes. In rare cases the application of the sodium salt of PAS results in water retention and a reduction of blood potassium. Other very rare consequences of PAS medication are hypoglycemia and hemolytic anemia, the latter being traced to the oxidizing effects of certain metabolic products derived from PAS. The second, more important, group of side effects consists of drug exanthemas, febrile reactions, angioneurotic edema, anuria, polyneuritis, and of the symptoms encountered in some of the authors' cases, namely, febrile reactions with blood eosinophilia and transient perifocal pulmonary infiltrations. All of the symptoms in this second group have the following characteristics in common: (*1*) manifestation after a latency period of eight days to ten weeks; (*2*) rapid disappearance of symptoms after stopping the medication; and (*3*) reappearance upon return to the medication, the latency period being remarkably shorter. The allergic nature of these symptoms is discussed. In 2 cases desensitization was at-

tained by administering small, progressively increasing doses, so that the therapy could be continued without further adverse effects.—*Nebenerscheinungen im Verlaufe der Tuberkulosebehandlung mit Paraaminosalicylasäure (PAS), L. Morandi, H. Ochsner, & A. Neuenschwander, Schweiz. med. Wchnschr., December 29, 1951, No. 52: 1301.—(E. Dunner)*

Tuberculostatic Effect of Urine.—The bacteriostatic effect on human tubercle bacilli was determined in urine from tuberculin-negative and tuberculin-positive healthy individuals, from healthy vegetarians, and from patients with active tuberculosis. The majority of the urines examined showed a strong inhibitory effect on the growth of tubercle bacilli. The degree of inhibition varied with different individuals and with the same individual at different times. Any appreciable differences among the different groups of persons considered seemed not to occur, however. No differences with sex were noticeable. The active substance was excreted regardless of the pH of the urine. Human urine had also a bactericidal effect on tubercle bacilli. The tuberculostatic and bactericidal effect of urine can probably influence the course and spreading of tuberculosis situated along the urinary tract (Author's summary).—*On the effect of human urine on tubercle bacilli, K. B. Björnesjö, Acta tuberc. Scandinav., 1951, 25: 425.—(K. T. Bird)*

Tuberculostatic Effect of Urine.—The factor responsible for the growth inhibitive effect of urine on tubercle bacilli is not volatile, and is resistant to the action of acid, alkaline, and neutral solutions at 100° C. The factor is soluble in water and in absolute alcohol, but does not dissolve in acetone, ether, petroleum ether, benzene, carbon tetrachloride, or chloroform. The factor dialyses easily through cellophane. The effect of the tuberculostatic factor is weakened by the addition of serum albumin. In electrodialysis experiments, the anode and middle fractions regularly have a tuberculostatic effect, while the cathode fraction shows no activity. The strongest activity occurs in the anode fraction (Author's summary).—*On the effect of human urine on tubercle bacilli: III. The solubility of the tuberculostatic factor in organic solvents, and its behavior in dialysis and electrodialysis, K. B. Björnesjö, Acta tuberc. Scandinav., 1951, 25: 457.—(K. T. Bird)*

Antibiotics for Pneumococcic Pneumonia.—In a series of 2,194 patients more than ten years of age with pneumococcic pneumonia, 1,274 patients were treated with sulfonamides and 920 with penicillin, aureomycin, or terramycin. The case fatality rate for all patients treated with antibiotics was 5.1 per cent, compared with 12.3 per cent for sulfonamides. The case fatality rate for patients over the age of 59 years who were treated with antibiotics was 15 per cent. Bacteremia, delay in treatment, and complicating disease added to the fatality rate. Bacterial complications of pneumococcic pneumonia appeared in 3.2 per cent of patients under treatment with antibiotics, compared with 6.8 per cent of patients who were treated with sulfonamides. Early diagnosis and treatment of patients with pneumococcic pneumonia and particular attention to persons in the older age groups and to patients with chronic diseases can result in a further decrease in the number of deaths from this disease.—*The effect of antibiotics (penicillin, aureomycin, and terramycin) on the fatality rate and incidence of complications in pneumococcic pneumonia: A comparison with other methods of therapy, A. F. Dowling & M. H. Lepper, Am. J. M. Sc., October, 1951, 222: 396.—(W. J. Steininger)*

Antibiotics for Bacterial Pneumonia.—A series of 50 patients with bacterial pneumonia were treated with aureomycin, and 50 with chloramphenicol. The response to therapy was good in both groups, and superiority could not be claimed for either antibiotic. Complications occurred in 16 patients in the entire series. There were 7 deaths, only 4 of which could be attributed to pneumonia alone. Pneumococci isolated from the patients treated were somewhat more susceptible *in vitro* to aureomycin than to chloramphen-

icol. On the other hand, blood serum concentrations four hours following the ingestion of chloramphenicol, 1 gm., were considerably higher than those obtained with aureomycin. One gram of either drug daily, in a single dose, seemed to be adequate for the majority of patients with pneumococcic pneumonia. Larger doses are indicated in the treatment of pneumonias caused by gram-negative bacilli, especially in those caused by the Friedländer bacillus.—*Comparison of aureomycin and chloramphenicol in treatment of bacterial pneumonia, W. M. M. Kirby, J. C. Michel, D. H. Coleman, J. W. Haviland, & D. R. Sparkman, J.A.M.A., September 8, 1951, 147: 110.—(H. Abeles)*

Resorption of Penicillin Aerosol.—Penicillin concentrations were determined in the blood following inhalation of penicillin aerosol. In most healthy persons, the blood level of penicillin was highest twenty minutes after inhalation, then decreased quickly, and was zero in more than one-half of the cases at the end of two hours. In patients with emphysema the highest blood level was reached only one or two hours after the inhalation. In patients with bronchial asthma, the penicillin concentration in the blood decreased faster than in normal persons. In patients with bronchial asthma and cardiac insufficiency, the penicillin level remained unchanged for approximately one hour following the inhalation and fell quickly in the second hour. In all cases where aludrin was given together with the penicillin aerosol, the penicillin level in the blood rose for one hour following the inhalation. When morphine was given subcutaneously prior to the penicillin inhalation, the penicillin level in the blood was the same one hour after the inhalation as it was twenty minutes after the inhalation. Caffeine had no effect on the penicillin level. The conclusion is made that certain pathologic lung conditions are characterized by typical penicillin blood curves, caused by changes in the permeability of the alveolar cells and the lung capillaries.—*Die Resorption des Penicillinaerosols unter normalen und pathologischen Lungenzustaenden, O. Weinmann, H. Hammerland, & E. Huber, Wien. klin. Wchnschr., February 29, 1952, 64: 151.—(G. C. Leiner)*

Treatment of Postoperative Pulmonary Complications.—An unselected series of 160 men who underwent inguinal herniotomy was selected for a study. The patients were divided into four groups who were treated as follows: (*1*) procaine penicillin, 600,000 units intramuscularly before operation; 300,000 units daily for five days after operation; (*2*) procaine penicillin, as in *Group 1;* breathing exercises twice daily for five days starting two days before the operation; (*3*) breathing exercises as in *Group 2;* (*4*) no treatment. An equal distribution of smokers and bronchitics among the four groups was assured. Each patient was examined clinically before operation and daily thereafter. Roentgenograms were taken before and after operation. It was found that there was no significant difference in the incidence of pulmonary complications between the different groups.—*Effect of procaine penicillin and breathing exercises in postoperative pulmonary complications, K. W. V. Palmer & B. A. Sellick, Lancet, February 16, 1952, 1: 345.—(A. G. Cohen)*

New Fungicides for Coccidioides.—Stilbamidine (Merck) and Rimocidin (Pfizer) were tested *in vitro* against *Coccidioides immitis.* Rimocidin is derived from a culture broth of *Streptomyces rimosus,* as is terramycin. The drugs were put in Sabouraud's medium and inoculated with a loopful of pus from a coccidioidal abscess. The Petri dishes were sealed with Scotch tape, placed at room temperature, examined five days later, and daily thereafter. In controls *Coccidioides* grew as expected. Rimocidin completely inhibited the growth of *C. immitis* in a concentration of 25 γ per ml.; Stilbamidine inhibited the growth at 75 γ per ml. Clinical trials are planned with both drugs.—*Two new fungicides for Coccidioides immitis, R. Cohen & J. Bos, Arch. Pediat., January, 1952, 69: 33.—(M. J. Small)*

LABORATORY STUDIES

Recovery of Pathogens After Embalming.—Necropsies often are performed on embalmed bodies. Pathologists generally believe that microorganisms in the tissues are rapidly killed by embalming so that bacteriologic studies of such bodies would not yield results. During the past six years, bacteriologic studies were done on tissues from 25 embalmed bodies. Surprisingly, the etiologic agent was isolated without difficulty in pure culture if there was a delay of only two days before examination. After the surface of the tissue to be cultured had been cauterized, a portion was removed with sterile scissors, finely minced, then ground in a sterile mortar and diluted with saline solution to give approximately a 10 per cent emulsion of the tissue. The emulsion was used for bacteriologic examination in the manner employed for fluids. In addition to other common pathogenic bacteria, tubercle bacilli were isolated from 22 of the 25 embalmed bodies. Tubercle bacilli were cultured from many bodies which had been embalmed for twenty-four hours or more, and in one case the body had been embalmed sixty hours before the tissue was emulsified. The lesions from which the organisms were isolated were not surrounded with a fibrotic wall, but were well-vascularized areas which, on a histologic basis, would appear to permit rapid penetration of the embalming fluid. Arterial embalming, as commonly practiced, does not sterilize infected tissues within twenty-four to forty-eight hours, and such tissues may infect those who handle them. These materials may be a source of tuberculosis for pathologists and others who have contact with cadavers.—*The isolation of pathogens from tissues of embalmed human bodies, L. A. Weed & A. H. Baggenstoss, Am. J. Clin. Path., December, 1951, 21: 1114.*—(*J. S. Woolley*)

Fluorescence and Virulence of M. Tuberculosis.—No perfect correlation was found between the acid-fastness of tubercle bacilli, as shown by Ziehl's method, and their fluorescence in the presence of auramine. Among 123 cultures of *Mycobacteria*, approximately 14 per cent did not become fluorescent. The degree of fluorescence was not identical in all cultures and some specimens show hardly any. Variability was especially marked in *M. paratuberculosis*. Fluorescence was, however, invariably present in both human and bovine types of *M. tuberculosis*. While yielding better results than other staining methods, fluorescence microscopy is not sufficient to make a final diagnosis of tuberculosis, and its results should be confirmed by cultures or guinea pig inoculation. Among 30 cultures of *M. tuberculosis*, Dubos' cytochemical reaction proved strongly positive. The test may therefore be useful in determining the virulence of recently isolated specimens. As it was also positive in 30 per cent of the other cultures examined, it cannot be considered as specific for *M. tuberculosis*. No correlation was found between the results of fluorescence and virulence tests. The further use of these two methods for bacterial classification should be carefully studied.—*Contribuição ao estudo das micobactérias, fluoromicroscopia e reação citoquímica de Dubos, L. de Andrade, Mem. Inst. Oswaldo Cruz, 1951, 49: 7.*—(*A. A. Moll*)

Fluorescence Microscopy.—The possibility of demonstrating tubercle bacilli in clinical specimens is increased by the use of the fluorescence microscope. Among 402 specimens of pleural exudate, sputum, and urine stained with erythrosin, 33.5 per cent of the cases were reported positive as compared with 11.4 per cent positive findings when using the Ziehl-Neelsen stain. The aforementioned specimens were from untreated patients. After treatment with thiosemicarbazone there is a decrease in acid-fastness with a corresponding increase in the advantage of the use of the fluorescence microscope as compared with the Ziehl-Neelsen stain.—*Die fluoreszenzmikroskopische Selektivdarstellung des Tuberkelbazillus, E. Jensen & G. Gohde, Tuberkulosearzt, 1951, No. 1: 11.*—(*E. Dunner*)

Arithmetic Linear Growth of M. Tuberculosis.—The expression "linear growth" describes bacterial reproduction in which bacterial density is a straight line function of time; in the usual state, the logarithm of the bacterial density has such a relationship. Such linear growth occurs regularly as a growth phase of *Mycobacterium tuberculosis* var. *hominis*, strain H37Rv, under certain conditions. The rate of growth was determined in a modified Dubos Tween-albumin medium, inoculated either from seven- or eight-day-old cultures in this medium or from the pellicle of a 21-day-old culture in a similar medium containing 2 per cent glycerol but without Tween, albumin, and glucose. Approximately ten million organisms per ml. were present initially. Growth was measured turbidimetrically at twenty-four-hour intervals for a total of nineteen days. Growth was typically "logarithmic" for the first four days, and then there followed an arithmetic linear growth phase lasting twelve days. The growth after sixteen days appeared to enter a true stationary phase. Additional studies indicate that this phenomenon is not peculiar to this strain of *M. tuberculosis* or to the particular liquid medium used.—*The arithmetic linear growth of Mycobacterium tuberculosis var. hominis, M. W. Fisher, W. F. Kirchheimer, & A. R. Hess, J. Bact., September, 1951, 62: 319.*—(*F. G. Petrik*)

Hemagglutination Test in Tuberculosis.—An average of 6 Dubos-Middlebrook hemagglutination tests were performed over an average period of nine months for each of 89 patients with active tuberculosis. The shortest period between the first and last test in any patient was six months and the longest period was thirteen months. The tests were made just prior to, during the course of, and following the completion of streptomycin therapy. The original titers showed no significant correlation with the clinical stage of the disease except that high titers were more frequent in patients with more advanced disease. The tests gave negative results (titers of 0 or 1:2) in 27 of 89 patients with definitely active tuberculosis. No close correlation was found between the course of the disease and the change in titer. In fact, the titer remained constant in the majority of patients regardless of the progress of the disease. In those in which the titer changed there was no relationship between this change and the effectiveness of therapy. Again, some patients with afebrile courses had high titers and others had low titers, and the same was also true for patients with febrile courses. Thus, there was insufficient correlation with the activity of the disease to be of prognostic value.—*The hemagglutination test in tuberculosis, D. M. Spain, W. G. Childress, & C. Rowe, Am. J. Clin. Path., January, 1952, 22: 86.*—(*J. S. Woolley*)

Serum Tributyrinase in Tuberculosis.—The serum tributyrinase activity was determined for 214 tuberculous patients. The results show that in mild cases the tributyrinase levels were in the normal range. When the disease was severe, the enzymatic activity fell to low normal or subnormal values. Improvement or deterioration in the condition of patients with advanced tuberculosis was reflected in either a rise toward normal or a further fall in serum tributyrinase values.—*Human serum tributyrinase; II. Levels in tuberculosis, J. Tuba & R. Hoare, J. Lab. & Clin. Med., September, 1951, 38: 428.*—(*F. G. Petrik*)

Lymphocytes in Pulmonary Tuberculosis.—Differential counts were made of small lymphocytes (called *Group I*) and other forms of lymphocytes (called *Group II*). In the normal blood, 4 to 8 per cent of the cells belong to *Group II*. *Group II* is increased in active pulmonary tuberculosis. The term "negative dissociation" is used for an increase of *Group II* and decrease of *Group I;* it is considered to be the first manifestation of an activation of the disease and occurs earlier than the changes in roentgenogram, sputum, erythrocyte sedimentation rate, or body temperature. The increase of *Group I* and decrease of *Group II* is called "positive dissociation";

it is characteristic for the improvement of the pulmonary disease.—*Ueber Veränderungen der Lymphozytenformen in bestimmten Stadien der Lungentuberkulose, K. Paul, Wien. klin. Wchnschr., February 29, 1952, 64: 155.*—(*G. C. Leiner*)

Hydrogen Transfer Capacity of Mycobacteria.—The methods for measuring the hydrogen transfer capacity of *Mycobacteria*, conditions which influence the delicacy and precision of the measurements, and certain differences between the behavior of suspensions of *M. lepraemurium* and *M. phlei* were studied. Murine leprosy bacilli were recovered from testicular homogenates, and *M. phlei* was grown on a fortified heart infusion broth culture. Tetrazolium violet was used for measuring the hydrogen transfer capacity. There were characteristic differences between the washed suspensions of *M. lepraemurium* and those of the rapidly growing *M. phlei*. With respect to the reduction potentials produced and the rates of hydrogen transfer, *M. lepraemurium* was very feeble. Nevertheless, this organism possessed a considerable capacity to transfer hydrogen. This ability was remarkably persistent and more stable than that of *M. phlei*. *M. phlei* suspensions transferred hydrogen at a much higher rate, responding to the substrate under both aerobic and anaerobic conditions. They are badly handicapped at pH levels existing in organs. Identical conditions appear to be optimal for preserving the hydrogen transfer capacity of the two microorganisms when surviving on endogenous reserves during incubation. It is under these circumstances that they may most reliably be compared.—*Measurement of the hydrogen transfer capacity of Mycobacteria, J. H. Hanks, J. Bact., November, 1951, 62: 521.*—(*F. G. Petrik*)

Hydrogen Transfer Capacity of Murine Leprosy Bacilli.—The relation between hydrogen transfer capacity and the viability of mycobacterial suspensions was studied by the tetrazolium technique. In so far as one may judge from the demonstrated relations between the plate counts and the hydrogen transfer capacity of *M. phlei* suspensions, it may be concluded tentatively with respect to *M. lepraemurium* that: (*1*) The hydrogen transfer capacity of washed suspensions provides an estimate of the number of living cells. (*2*) This relation is also valid in damaged suspensions provided the bacteria are rewashed prior to testing. (*3*) The hydrogen transfer capacity of incubated suspensions is an indication of the relative (not the actual) levels of viability which exist among aliquots of a given suspension.—*The biological significance of the hydrogen transfer capacity of murine leprosy bacilli, J. H. Hanks, J. Bact., November, 1951, 62: 529.*—(*F. G. Petrik*)

Prevention of Contaminated Cultures.—Acti-dione, an antibiotic obtained from *Streptomyces griseus*, has been shown to inhibit the growth of yeasts and molds on agar plates used for air sampling. Its effect on contamination of egg-yolk media used for sputum cultures for tubercle bacilli was therefore tested. There was no inhibition of growth of small inocula of tubercle bacilli by the antibiotic in a concentration of 1.0 mg. per cc. Acti-dione, however, did not prevent contamination resulting from the planting of tuberculous sputums with or without prior treatment with oxalic acid or trisodium phosphate. Contamination occurred in a small percentage of specimens treated with either oxalic acid or trisodium phosphate, but could be completely prevented by treating the sputum with both of these agents.—*Cycloheximide (antibiotic Acti-dione) as a fungicide in solid media for growing tubercle bacilli from sputum, H. J. Corper & M. L. Cohn, Antibiotics, January, 1952, 2: 12.*—(*W. M. M. Kirby*)

Iron-Containing Crystals and Schaumann Bodies.—Giant cells containing Schaumann bodies are often present in sarcoid and sarcoid-like granulomas. In addition, crystalline inclusions of a distinctive type are sometimes seen. Two autopsied cases showed disseminated sarcoid-like granulomas and single giant

cells containing Schaumann bodies closely associated with iron-containing crystals. In both cases the Schaumann bodies surrounded the crystalline material. Studies of the crystalline material indicated that it is probably inorganic, contains ferric iron, and is soluble in acids but not in bases. The crystals do not contain beryllium, silicon, or calcium. The Schaumann bodies were shown to contain calcium phosphates. The possibility is suggested that the Schaumann bodies may form as a reaction to the intracytoplasmic crystalline material.—*The association of iron-containing crystals with Schaumann bodies in the giant cells of granulomas of sarcoid type, R. L. Engle, Jr., Am. J. Path., November–December, 1951, 27: 1023.*—(*J. S. Woolley*)

Green Sputum.—It is known that patients with bronchiectasis may raise green sputum; conversely, patients who raise green sputum are often found to have bronchiectasis. The five possible sources of the pigment are: (*1*) bacterial, (*2*) red blood cells, (*3*) white blood cells, (*4*) bronchial or alveolar cells, and (*5*) blood serum or its breakdown products. *Pyocyaneus* infection is found only rarely. The cause, therefore, had to be sought elsewhere. Fifty samples of green sputum from patients with bronchiectasis or abscess were examined. After centrifuging, emulsification in chloroform yielded a greenish upper layer. This was centrifuged. Eventually a clear green solution was obtained. Typical spectrophotometric curves were obtained, similar to curves described for verdoperoxidase. Further tests proved that the sputum pigment is actually this substance which is a product of the disintegration of granulocytes. Therefore, in most cases, greenish sputum is purulent sputum in which stagnation prevents the elimination of verdoperoxidase. Very occasionally, greenish sputum is caused by contamination with *Ps. aeruginosa*, usually outside the body. Rarely, it may be caused by a hepatobronchial fistula.—*Green sputum, A. J. Robertson, Lancet, January 5, 1952, 1: 12.*—(*A. G. Cohen*)

Respiratory Function.—In respiratory function tests used in Holland, the respiratory reserve is defined as the relation between the quantity of oxygen consumed on maximal effort and that used by the individual at rest. All the functions which participate in respiration must collaborate for mobilization of this reserve. These functions are: (*1*) the activity of the right side of the heart; (*2*) the ability of the blood to become oxygenated, chiefly determined by the hemoglobin percentage; (*3*) the capacity of the muscles to extract oxygen; (*4*) the replenishment of gas in the lung alveoli by the respiratory movements; and (*5*) the permeability of the alveolar membrane. It is not only vital capacity which is important but the speed with which air can be displaced. This is measured as maximal breathing capacity, which determines how much of the vital capacity can be used during an accelerated ventilation on effort. In practice, the author usually employs, instead of the maximal breathing capacity, the "pulmonary capacity utilizable on effort" of Tiffeneau. This is defined as the largest volume of gas which can be exhaled in the first second of expiration. It is found to parallel closely the maximal breathing capacity, and its determination is less taxing to the patient. In both health and disease the fastest expiration is during the first second following a full inspiration. Probably during a great effort one automatically breathes at a level which allows the fastest exchange, and this may explain the fact that emphysematous and asthmatic patients invariably breathe in an inspiratory position, this position probably being under the circumstances the most favorable for alveolar ventilation. Using the method developed by Fowler for continuous photometric determination of nitrogen, the author has confirmed the work of others which has demonstrated that in cases of emphysema the expired alveolar air is of inconstant composition. The respiratory equivalent (the number of liters of air which must be ventilated to permit the absorption of 100 cc. of oxygen) is another determination of great value. It is important that the patient be

entirely relaxed for this test, as a slight increase in psychogenic ventilation may cause marked artificial elevation in the respiratory equivalent. For this reason, determinations are best made with moderate effort, in which case the ventilation is determined by the physiologic stimulus of work and the psychogenic factor becomes of less importance. Conditions causing an elevation of the respiratory equivalent are emphysema through increased ventilation, diffusion difficulties through insufficient oxygen uptake, and cardiac failure through slowing of the pulmonary circulation. In certain cases of tuberculosis the respiratory equivalent is elevated because of circulatory stasis or anemia. The most useful information can be gained through bronchospirometric determinations of the respiratory equivalent. It is found that even a small unilateral tuberculous lesion, such as a tuberculoma, will cause a slight but measurable diminution of oxygen consumption on the affected side. If the ventilation of the two lungs is equal, the respiratory equivalent will be higher on the affected side. This may be the only functional abnormality produced by such a lesion. Evidence suggests that intrapulmonary shunts occur through a reflex closure of blood vessels secondary to local hypoxia. Determination of oxygen saturation of the arterial blood, particularly after exercise, is a valuable part of function studies. When functioning pulmonary tissue is lost, the organism tries to maintain a level of oxygen saturation sufficient to furnish the tissues with oxygen. An example of such an attempt is the shunting of blood. The most practical application of respiratory function studies is in evaluating a patient for operation. It is important to know (*1*) the function of the part of lung to be resected, (*2*) the loss of function which habitually accompanies the operation, and (*3*) the function of the lung not to be resected. The answer to the second question may be of crucial importance in the immediate postoperative period.—*Des réserves respiratoires dans les conditions normales et pathologiques et de l'efficacité de la ventilation et de la circulation pulmonaires, G. van Veen, Poumon, January, 1952, 8: 51.*—(*F. S. Lansdown*)

Intrapulmonary Gas Distribution.—Current understanding of the intrapulmonary distribution of inspired gas is incomplete. In an adult subject sitting at rest, the normal lung is not uniformly ventilated, but some alvolar spaces have a more rapid turnover rate of "deeper" ventilation than others. This is probably caused by variations in the percentage volume changes of various lung regions, and/or preferential distribution of the dead space gas. The evidence supporting this view is indirect. There is no substantial evidence to indicate the spatial location of the hypoventilated and hyperventilated regions. The operation of the physical factors which produce uneven alveolar ventilation is obscure, reflecting the current deficiencies in understanding of the mechanics of the lung as a whole, and particularly of its parts. The latter has been largely neglected since Rohrer's theoretical work on bronchial resistance in 1915. Uneven alveolar ventilation is not necessarily a deviation from physiologically 'ideal' conditions. Variations in the ventilation rate of different regions of the lung, when properly integrated with the perfusion, may well permit a respiratory adaptability to various conditions which would otherwise interfere with gas exchange. The existence of uneven alveolar ventilation emphasizes that the lungs and breathing apparatus are not a simple or necessarily homogenously functioning system. This indicates a potential inadequacy of many concepts which so assume, or which have arisen from methods that measure the net effect of the whole system, without revealing the direction or magnitude of the components. Physiological commonplaces such as "the alveolar ventilation (or blood flow) is x liters/minute," and "anoxia (or nerve action) constricts pulmonary vessels" represent net effects which may or may not be representative of events in all regions of the lung (Author's conclusions).—*Intrapulmonary distribution of in-*

spired gas, W. S. Fowler, Physiol. Rev., January, 1952, 32: 1.—(G. C. Leiner)

Alveolar Carbon Dioxide.—A method of rapid analysis of the carbon dioxide level in expired air based on the absorption of infrared radiation was used. Attempts to measure alveolar carbon dioxide during expiration indicated that, following an initial rapid rise associated with clearing of the dead space, the carbon dioxide level of the expired air continued to rise at a rate of approximately 0.1 per cent per second. The same rise at a similar rate was also observed in expiration of different volumes in equal times, of equal volumes in different times, and following breath-holding. The rate of rise following exercise was greater, due probably to increased pulmonary blood flow; and during the early phase of hyperventilation, due probably to an increased arterial-venous gradient. In later stages of hyperventilation, the rate of rise of carbon dioxide in the expired air decreased. During breath-holding, measurable quantities of carbon dioxide diffused into the dead space. It was possible to reach an equilibrium between carbon dioxide in the expired air and the venous blood by rebreathing appropriate concentrations of the gas. In a subject with emphysema, it was shown that the level of carbon dioxide rose very high in deep expiration and this was attributed to regional variations in the level of alveolar carbon dioxide which were expired asynchronously.—*Alveolar CO_2 measured by expiration into the rapid infrared gas analyzer, A.B. DuBois, R. C. Fowler, A. Soffer, & W. O. Fenn, J. Appl. Physiol., January, 1952, 4: 526.*—(*W. J. Osher*)

Alveolar Carbon Dioxide.—Variations in alveolar carbon dioxide during the respiratory cycle were investigated by considering the factors associated with respiration which alter the alveolar concentration of the gas. During breath-holding for periods up to twenty seconds, the alveolar partial pressure of carbon dioxide increased along a logarithmic curve approaching the value for its concentration in oxygenated venous blood. This curve could be determined by an equation, the constant of which, for each individual, was an exponent made up of values for the slope of the dissociation curve of carbon dioxide, the rate of pulmonary blood flow, the barometric pressure minus water vapor pressure at body temperature, and the equivalent lung volume, the last being the alveolar gas volume plus the capacity of pulmonary capillary blood, pulmonary tissue, and tissue fluids for carbon dioxide. Inspiration of a known volume of carbon dioxide caused a drop in alveolar partial pressure of the gas which was not as great as would have been expected by dilution alone. The data of all these experiments could be explained on the basis that carbon dioxide output is proportional to the arterial-venous difference of partial pressure of carbon dioxide and rate of pulmonary blood flow and inversely proportional to the size of the reservoir into which the gas diffuses from the blood. In the latter experiments, increased rate of blood flow and loss of carbon dioxide from the pulmonary capillary blood, both of which would be favored by inspiration, probably accounted for the unexpectedly high figure. During expiration, likewise, the alveolar partial pressure of carbon dioxide increased more rapidly than would have been expected from the data on breath-holding, and this could be accounted for by the decreasing lung volume. On the basis mainly of these considerations, it was possible to compute, for each 0.1 second of the respiratory cycle, the alveolar partial pressure of carbon dioxide and obtain a curve describing its fluctuations during respiration. The alveolar partial pressure of carbon dioxide would thus be determined in the following manner: (*1*) an initial rise during early inspiration, due mainly to the arrival of carbon dioxide-rich tracheal air and partly counterbalanced by the increasing lung volume; (*2*) a maximum followed by a decline as the arrival of fresh air changed the ratio of the carbon dioxide output to the equivalent lung volume; (*3*) a minimum near the end of inspiration, due to the increase of the ratio of

carbon dioxide output of the equivalent lung volume by the greater arterial-venous difference, and by the dilution factor decreasing because of the diminishing rate of air flow; (*4*) a continuous rise with expiration, due to the factors described during breath-holding intensified by the diminishing lung volume. This curve indicated that the mean alveolar carbon dioxide could be sampled best just after mid-expiration when the curve reaches the proper value and has a gentle slope.—*Alveolar CO_2 during the respiratory cycle, A. B. DuBois, A. G. Britt, & W. O. Fenn, J. Appl. Physiol., January, 1952, 4: 535.*—(*W. J. Osher*)

Diffusion Across Alveolar Membrane.—The rate of diffusion of nitrogen into the lungs and the blood was measured in one adult man. Nitrogen was first cleared from the body by allowing the subject to breathe pure oxygen for thirty minutes. Following this, the nitrogen concentration of the expired air was measured when the subject was allowed to breathe room air (*1*) spontaneously, (*2*) by artificial respiration with a compression (Schafer) method, (*3*) by artificial respiration with an expansion (hip-roll) method, and (*4*) spontaneously. Artificial respiration was administered in a standardized manner by a mechanical device. The data indicated that, for a given amount of ventilation, the expansion method was more efficient in restoring the nitrogen saturation of the lungs and, by inference, of the blood than the compression and that the former approximated more closely the effects of spontaneous breathing.—*Rate of pulmonary nitrogen accumulation as an index of lung to blood transfer of gases, H. Specht & H. F. Brubach, J. Appl. Physiol., January, 1952, 4: 554.*—(*W. J. Osher*)

Hypoxia and Renal Function.—Eight experiments were carried out on 2 female dogs and 2 young adult male subjects. Hypoxia was induced by causing the subjects to breathe mixtures containing 9.4 and 6.3 per cent oxygen. Under these conditions, tubular activity, as measured by the secretion of *p*-aminohippurate and absorption of glucose, showed no evidence of impairment. This occurred in spite of the observation, made previously by other authors, that the kidney operates at a higher partial pressure of oxygen and at a lower arterial-venous oxygen difference than do most other organs.—*Effects of hypoxia on renal tubular function, D. R. Axelrod & R. F. Pitts, J. Appl. Physiol., January, 1952, 4: 593.*—(*W. J. Osher*)

Pulmonary Vascular Capacity.—Changes in pulmonary vascular capacity produced by altering pulmonary blood flow and by positive and negative pressure inflation were evaluated by simultaneous quantitative registration of the internal and external volumes of a lung lobe placed in an oncometer. The lobe was maintained under different degrees of expansion under oxygen tension and was perfused by the arterial blood from a carotid artery in order to avoid exchange of gases and physical changes in plethysmographic volumes. The volume of flow could be varied widely by means of a screw clamp and was measured with the aid of a rotameter. In all states of constant inflation there is a greater increment of intrapulmonary blood for an equivalent increase in flow when blood flow is low than when it is high. In comparison with a deflated lung, equivalent increases in blood flow cause more accumulation of blood when the lung is inflated by positive pressure, and allow less accumulation when distended by negative pressure around it. Estimates of total vascular capacity changes indicate that, with a cardiac output less than 500 cc. per minute, 15 cc. of every 100 cc. increment is stored in the lungs; at higher outputs approximately 5 cc. of every 100 cc. increment of output remain in the lungs. The current opinion was confirmed that progressive lung inflation by negative pressure, blood flow remaining constant, augments the intrapulmonary vascular capacity. The prevailing concept that, on the contrary, positive pressure inflation reduces pulmonary vascular capacity was supported in 3 cases only, and in these inflation by positive pressures less

than 40 or 50 mm. of water resulted in a slight increase in blood retention. In 6 other experiments, progressive lung inflation by positive pressures up to 130 mm. of water was accompanied by a steady increase in pulmonary vascular volume. The general conclusion appears justified that lobes of lungs from different animals react unevenly to extreme inflation by positive pressure. However, moderate degrees of positive pressure inflation act in the same manner as negative pressure inflation to increase intrapulmonary vascular capacity. The degree of pulmonary inflation at which pulmonary vascular capacity remains constant or diminishes is more variable with positive than with negative pressure inflation (Author's summary).—*Effects of pulmonary blood flow and distention on the capacity of intrapulmonary vessels, A. Ochsner, Am. J. Physiol., January 1, 1952, 168: 200.*—(*G. C. Leiner*)

Functional Restoration of the Paralyzed Diaphragm. — Intrathoracic cross-anastomosis of the vagus and phrenic nerves of the dog was performed. Regeneration of the parasympathetic preganglionic vagal fibers (visceral efferent fibers) into the distal fragment of the phrenic nerve (somatic motor nerve) of the dog has been accomplished for the first time. Preganglionic vagal fibers re-innervated the paralyzed diaphragm, which then contracted actively, rhythmically, and automatically. The re-innervated half of the diaphragm, restored to useful function, was alone capable of maintaining breathing movements compatible with the active life of the dog, even after the opposite half of the diaphragm had been rendered nonfunctional. Because the preganglionic vagal fibers normally transmit rhythmic impulses, the functional outcome in the dog suggests that the central connections of these fibers are not altered or modified when they assume their new role in diaphragmatic innervation. The practical application of this study to patients with respiratory muscular paralysis due to injury or disease is obvious.—*Functional restoration of the paralyzed diaphragm following the cross-union of the vagus and phrenic nerves, J. O. Brown & V. P. Satinsky, Am. J. M. Sc., December, 1951, 222: 613.*—(*W. J. Steininger*)

Respiration Mechanics.—The effectiveness of three methods of artificial respiration, the Holger-Nielsen arm-lift back-pressure, the hip-lift back-pressure, and the Schafer prone-pressure methods, were measured in 8 apneic, living patients as to air-flow rates and pulmonary ventilation. Ventilation with the prone-pressure methods was not adequate but was excellent with the other two methods which had an active inspiratory phase. Air-flow records were used to determine the most efficient timing of the maneuvers. Data for the pressure-volume curve expressing the elastic characteristics of the respiratory apparatus were obtained in 2 of the subjects. By reference to this curve, the effectiveness of changes of pressure in the airway, as expressed by volume of ventilation, could be estimated.—*Mechanics of breathing in relation to manual methods of artificial respiration, J. L. Whittenberger, J. E. Affeldt, W. T. Goodale, & S. J. Sarnoff, J. Appl. Physiol., December, 1951, 4: 476.*—(*W. J. Osher*)

Positive Intrapulmonary Pressure.—The circulatory effects of positive intrapulmonary pressure were studied in 7 human subjects before and during anesthesia with sodium thiopental. Arterial hypotension and decreased pulse pressure were noted following inflation of the lungs of these subjects with oxygen under pressures of 15 to 20 cm. of water. These effects were considerably more marked during anesthesia with sodium thiopental, and this was attributed to interference with vasomotor mechanisms by this agent. The effects of this drug alone on the circulation were also noted and they included tachycardia, decreased mean arterial and pulse pressure, and decreased intrathoracic venous pressure.—*Effect of sodium thiopental on circulatory response to positive pressure inflation of lung, H. L. Price, E. H. Conner,*

J. D. Elder, & R. D. Dripps, J. Appl. Physiol., February, 1952, 4: 629.—(W. J. Osher)

Respiratory Air Temperatures.—The temperature of air during inspiration and expiration was measured in the noses of human subjects at depths of 1, 5, and 9 cm. by means of a rapidly recording, accurate thermocouple. The effects of warm (23° to 28°C.), cool (5° to 8°C.), and cold (−20° to −31°C.) ambient temperatures were noted. Under these conditions, air was rapidly and progressively warmed as it passed through the nose during inspiration and gave up heat as it approached the outside during expiration. With the cooler ambient temperatures, the degree of these changes was more marked.—*Air temperatures in respiratory tracts of resting subjects in cold, P. Webb, J. Appl. Physiol., November, 1951, 4: 378.—(W. J. Osher)*

Pulmonary Function in Elderly Adults.—The pulmonary function was tested in 11 male and 15 female subjects, 50 years old or more, with no cardiopulmonary disorders by the usual clinical tests. As compared with healthy young adults, this group showed important changes which included reduction in the vital capacity, increase in the residual volume, increase in the functional reserve capacity, uneven pulmonary distribution of inspired gases, and a marked decrease in the maximal breathing capacity. Arterial oxygen saturation, partial pressure of carbon dioxide, and hydrogen ion concentration, however, remained within the normal limits for young adults. These results were noted to be consistent with changes involving the elasticity of the lungs, uneven obstructive processes, or the mechanics of respiration.—*Pulmonary function studies in healthy men and women 50 years and older, F. E. Greifenstein, R. M. King, S. S. Latch, & J. H. Comroe, Jr., J. Appl. Physiol., February, 1952, 4: 641.—(W. J. Osher)*

Production of Apnea.—It was necessary to make healthy adult male subjects apneic and incapable of cooperating so that they might serve as subjects for experiments on artificial respiration. It was possible to obtain complete apnea in 50 subjects by the intravenous administration of curare drugs. To prevent discomfort and/or cooperation on the part of the subject, light anesthesia was induced using sodium thiopental supplemented, when possible, with cyclopropane-oxygen mixtures through an endotracheal tube. Although no serious complications were encountered, there are hazards and minor sequellae.—*Barbiturate-curare-induced apnea for artificial respiration studies on normal adults: I., M. S. Sadove, A. S. Gordon, J. T. Nelson, & A. C. Ivy, J. Appl. Physiol., December, 1951, 4: 403.—(W. J. Osher)*

Ventilation in Artificial Respiration.—In anesthetized human subjects, made apneic by curare, the relative effectiveness of various methods of artificial respiration were assessed as to the volume of tidal exchange. The Schafer prone-pressure method was found to be less than one-half as effective in this respect as the push-pull methods which, in these experiments, included the hip-lift back-pressure, hip-roll back-pressure, and arm-lift back-pressure maneuvers, along with some modifications. When performed on a wheeled litter, all methods were less effective. Pneumotachographic studies of the rate of air-flow indicated that, from the standpoint of efficiency and practicality, the active phase of inspiration and expiration should last approximately 1.5 seconds each, separated by rest periods of equal length. In this manner, a complete cycle could be accomplished in five or six seconds, approximately ten to twelve times per minute.—*Air-flow patterns and pulmonary ventilation during manual artificial respiration in apneic normal adults: II., A. S. Gordon, J. E. Affeldt, M. Sadove, F. Raymon, J. L. Whittenberger, & A. C. Ivy, J. Appl. Physiol., December, 1951, 4: 408.—(W. J. Osher)*

Circulation During Artificial Respiration.—Anesthetized, curarized human subjects were given artificial respiration by the Schafer

prone-pressure, Eve rocking, hip-lift back-pressure, hip-roll back-pressure, and arm-lift back-pressure methods. In regard to the volume of ventilation, the prone-pressure and rocking methods gave the poorest results. There were no important differences in oxygen consumption between the methods, but the carbon dioxide output could be correlated with the minute ventilation. The mean arterial oxygen content could not be maintained at safe levels by the prone-pressure method in some of the subjects, although the other methods were adequate for this purpose. The arterial-venous oxygen difference remained within normal limits. High cardiac outputs were maintained with all methods of artificial respiration, suggesting that there was no important interference with venous return. In general, both systemic and pulmonary blood pressures rose with the application of back pressure. It was pointed out that arterial oxygen saturation offers an important criterion for the efficacy of a method of artificial respiration. The failure of the prone-pressure method in this respect, in spite of adequate ventilation, was thought most likely to have been due to uneven alveolar aeration.—*Circulatory studies during artificial respiration on apneic normal adults: III., A. S. Gordon, O. Prec, H. Wedell, M. S. Sadove, F. Raymon, J T. Nelson, & A. C. Ivy, J. Appl. Physiol., December, 1951, 4: 421.*—(*W. J. Osher*)

Energy Expended in Artificial Respiration.—The oxygen consumption of 5 operators was measured while they were applying artificial respiration to anesthetized, curarized subjects. On this basis, the Schafer prone-pressure method was the least taxing, the Silvester supine, arm-lift back-pressure, hip-roll back-pressure, and hip-lift back-pressure being more taxing, in that order. The sense of fatigue noted by the operators paralleled, in general, the oxygen consumption. Most operators, in addition, believed that the prone-pressure and arm-lift back-pressure methods could be continued indefinitely.—*Energy expenditure of operators during manual artificial respiration: IV., A. S. Gordon, F. Raymon, M. S. Sadove, H. Wedell, & A. C. Ivy, J. Appl. Physiol., December, 1951, 4: 439.*—(*W. J. Osher*)

Teaching Artificial Respiration.—Attempts were made to teach methods of artificial respiration to 667 Naval recruits and 124 Waves. These subjects were divided into groups which were taught the hip-roll back-pressure and hip-lift back-pressure methods along with variants of these which involved the use of a belt or of the arms instead of the hips. It was found that these procedures could be successfully taught over relatively brief periods in such a manner that they could be employed continuously over periods of at least ten minutes. The arm-lift back-pressure method was learned most easily and accurately. The methods involving manipulations of the hips were more difficult to learn and resulted in more fatigue to the operators.—*Pedagogical and performance factors of manual artificial respiration with Naval personnel: V., A. S. Gordon, S. Star, F. Meier, C. Hale, & A. C. Ivy, J. Appl. Physiol., December, 1951, 4: 447.*—(*W. J. Osher*)

Ventilation in Artificial Respiratio — Methods of artificial respiration were evaluated as to the amount of ventilation resulting from the procedure. The subjects were young males and females who respired into a metabolism apparatus. By watching the movements of the spirometer, the operator could note the onset of inspiration or expiration and then superimpose the proper maneuver of artificial respiration so as to increase ventilation. The excess of volume of inspiration or expiration assisted in this manner over the volume of quiet breathing was considered the ventilation due to the method of artificial respiration. By this criterion, the Schafer prone-pressure method was found to result in less than one-half of the ventilation of other methods which included the Nielsen arm-lift back-pressure, hip-lift, Silvester arm-lift chest-pressure, and hip-roll prone-pressure methods. The latter were almost equally effective in

providing a large tidal ventilation.—*Pulmonary ventilation in manual artificial respiration, P. V. Karpovich, C. J. Hale, & T. L. Bailey, J. Appl. Physiol., December, 1951, 4: 458.*—(*W. J. Osher*)

PUBLIC HEALTH AND EPIDEMIOLOGY

Tuberculosis Control in Holland.—In Holland in 1900, deaths from tuberculosis were 194 per 100,000. An active campaign against the disease had reduced the rate to 140 by 1914, but during World War I rose to 202.5 per 100,000. There was another peak during World War II when the rate rose from 41 to 86 per 100,000. Since then there has been a steady decline to 19 per 100,000 in 1950. The antituberculosis program has left the sanatoriums in the hands of private enterprise, but case finding and prophylaxis have been functions of the state. These functions are carried out by the Provincial Associations through district consultation dispensaries, of which there are now 42. The larger cities have their own dispensaries which operate independently of the Provincial Association. Home visits in the cities are made by specialist nurses; in the country and small towns, by the district nurses whose training has included a period in a consultation dispensary. Health insurance is compulsory for a large section of the population in Holland, and this has been an important factor in the growth of the sanatoriums. Since 1926, millions of patients have been cared for in sanatoriums, the costs being defrayed by the Invalidity Board. With the expansion of the sanatoriums, there have been new diagnostic techniques developed, such as bronchospirometry, tomography, and physiological studies, and new methods of treatment including antibiotics and excisional surgery. Many of the sanatoria are designated as teaching units. In order to qualify as a specialist in pulmonary diseases, a physician must have spent a year in a clinic of internal medicine, three years in a recognized sanatorium, and one year in a children's hospital, a medical clinic, or a tuberculosis center. The case-finding program, which began on a small scale with private industry in 1934, has been expanded by the consultation dispensaries to include examination of the entire population. BCG is given to groups subjected to extra hazard, such as nurses and medical students. In contrast to the decline in tuberculosis mortality, the number of active cases discovered has not changed significantly.—*L'organisation de la lutte contre la tuberculose aux Pays-Bas, F.-N. Sickenga, Poumon, January, 1952, 8: 3.*—(*F. S. Lansdown*)

Traces of Primary Lesions in Adults.—A study of 1,802 roentgenograms from nontuberculous adults at the Tuberculosis Service at Rio de Janeiro disclosed traces of primary lesions in 32 per cent of the group. Traces of the lesions were predominantly on the right side, 89 of 130 residual foci being there, and especially in the lower (54 per cent) and middle (34 per cent) lung fields.—*Freqüência radiológica dos vestígios de lesões primarias no adulto no tuberculoso, R. Fernandes, F. Poppe, & O. Reis. Clin. tisiol., July–September, 1951, 6: 371.*—(*A. A. Moll*)

Skeletal Tuberculosis in Brazil.—Osteoarticular tuberculosis still is important in Brazil where, in contrast to other places, it usually is caused by the human variety of tubercle bacilli. The prevalent habit of boiling all milk practically removes this food as a source of infection. In recent times the combination of dihydrostreptomycin and *p*-aminosalicylic acid has proved most successful in treatment.—*Considerações sobre alguns aspectos da tuberculose osteoarticular, D. A. Chaves, Clin. tisiol., October–December, 1951, 6: 459.*—(*A. A. Moll*)

BCG Vaccination in Austria.—Up to June, 1950, 739,699 children underwent tuberculin tests. Of these, 147,822 reacted to tuberculin and 507,541 were vaccinated with BCG. Between July 1, 1950 and June 30, 1951, 151,163 children underwent tuberculin tests. Of these, 35,297 reacted to tuberculin and 95,843 were vaccinated with BCG. Up to

June, 1950, 146,020 BCG-vaccinated children underwent tuberculin tests; of these, 123,627 reacted to tuberculin. Between July 1, 1950 and June 30, 1951, 175,877 BCG-vaccinated children underwent tuberculin tests; of these 139,206 reacted to tuberculin. In 7 cases there seemed to be a relation between BCG vaccination and subsequent disease. There were 3 cases of erythema nodosum, 3 cases of conjunctivitis phlyctaenulosa, and one case of hemotogenous tuberculosis. — *Die BCG. — Impfung in Oesterreich, F. Puntigam, Wien klin. Wchnschr., February 1, 1952,* ***64:*** *77.—(G. C. Leiner)*

Skin Reactions After BCG Inoculation.—Reaction after BCG inoculation can be affected by: (*1*) technical mistakes; (*2*) inoculation of an already infected person; (*3*) occurrence of impetiginous and eczematous changes around the site of inoculation, which are accentuated by trauma; (*4*) high-grade specific (lupus-like) reaction at the site of inoculation; (*5*) rare, persistent, bullous, pustulous, or erythrosquamous disseminated dermal reactions. In one 13-year-old boy histologically proved tuberculosis colliquativa cutis occurred in the region of the groin. Experiments on animals with material from the lesion gave a caseating, nonprogressive tuberculosis which could not be transferred to other animals. Local treatment of the site of inoculation with substances which might be irritating or allergenic should be avoided.—*Hauterscheinungen nach BCG-Impfung, K. W. Kalkoff, Tuberkulosearzt, 1951, No. 7: 416.—(E. Dunner)*

Silicosis in Clay Industries.—Ball-clay and china-clay are found in natural deposits. They are alteration products of granite. They are used extensively in manufacturing pottery and also in other industries. In some processes, the clay is ground down to a powder. Approximately 3,200 persons work in the china-clay and 984 in the ball-clay industries. Approximately half of these work in the mines and quarries. It is generally believed by physicians and others that no injuries to the lungs result from employment in these industries, but no large-scale investigation has ever been made. The chief constituent of china-clay contains less than 3 per cent free silica. Ball-clay from several different localities ranges in free silica content from 5 to 29 per cent. The author reports 2 cases of classical silicosis, one complicated by tuberculosis. One was seen in a ball-clay worker and the other in a china-clay worker.—*Silicosis in the ball-clay and china-clay industries, R. W. Thomas, Lancet, January 19, 1952,* ***1:*** *133.—(A. G. Cohen)*

THE AMERICAN REVIEW OF TUBERCULOSIS

ABSTRACTS

Edited by LAWRENCE B. HOBSON

VOLUME 66 SEPTEMBER, 1952 ABST. NO. 3

CLINICAL STUDIES, TUBERCULOSIS

Intrapleural and Aerosol Trypsin.—Pure crystallin trypsin, extracted from the pancreas, is a proteolytic enzyme which does not need enterokinase to activate it. It rapidly dissolves fibrin clots, decreases the viscosity of empyema fluid, and lyses only dead tissue. After an antihistaminic had been given and as much pus as possible aspirated from the chest, a 0.5 per cent solution was injected intrapleurally. The patient turned frequently in bed and sat up from time to time. On subsequent treatments, aspiration, saline lavage, and trypsin instillation were carried out. There were no harmful results and only one case in 17 was a complete failure. If the empyema was of less than six months' duration, tryptic debridement alone expanded the lung in 65 per cent of the cases. It was an excellent preparation for surgical decortication or section and was effective in both tuberculous and nontuberculous empyema. Aerosol trypsin inspired by patients with copious, tenacious, and purulent sputum, reduced the sputum viscosity, decreased its amount, and increased the vital capacity in 10 of 17 cases.—*The use of trypsin in chest disease, L. C. Roettig, H. G. Reiser, W. Habeeb, & L. Mark, Dis. of Chest, March, 1952, 21: 245.*—(*E. A. Rouff*)

Tuberculous Pleural Effusions.—Primary serous pleural effusion in children and young adults no longer presents an etiologic problem. Similar effusions in adults more than forty years of age are more difficult to diagnose because in this group there is less tuberculosis and more malignant disease. The etiology of serous pleural effusion was studied in 58 patients over the age of forty admitted to the Royal Infirmary of Edinburgh. Bronchogenic carcinoma was responsible in 11 cases and metastatic carcinoma from extrapulmonary neoplasms was found in 8 instances. Seven cases were due to pulmonary infections; 4 to collagen disease; and 2 were transudates of cardiac origin. Two cases were due to reticulosis, and one case was associated with pulmonary infarction. There were 2 cases of adult active pulmonary tuberculosis. The etiology of the effusion in one instance was uncertain. In only 20 cases could the effusion be ascribed to a primary tuberculous infection. Only one of these cases showed roentgenographic evidence of hilar gland enlargement, the only difference between the clinical picture of similar effusions in children and young adults. A follow-up of these 20 cases showed tuberculosis morbidity of 45 per cent, with a corresponding mortality. This figure compares unfavorably with an average tuberculous morbidity of 14 per cent calculated from nine series of cases of primary effusion in young adults. Only 3 of the older patients were given adequate convalescent care, a factor which may contribute to the poor prognosis. It was estimated that approximately 10 per cent of all primary tuberculous pleural effusions occur in adults over forty.—*Primary tuberculous pleural effusion in older age groups, R. F. Robertson, Brit. M. J., January 19, 1952, No. 4750: 133.*—(*E. A. Riley*)

Pneumothorax and Empyema.—Among 155 patients with therapeutic pneumothorax at the Waldsanatorium, Davos, Switzerland, 13 (8.4 per cent) had tuberculous empyema. Empyema was defined as a purulent pleural effusion from which tubercle bacilli were recovered on more than one occasion. One case received no special therapy, 4 cases were treated surgically, and 8 were treated conserv-

atively. Among the 4 surgically treated patients, 2 of whom died, 3 had proved bronchopleural fistulas. Of the 8 patients treated conservatively, 7 are considered cured. Conservative treatment consisted of repeated pleural aspirations and lavages with saline solution, Jessen's solution, Azochloramid, gentian violet, *p*-aminosalicylic acid, amithiozone, streptomycin, and TB VI. A mixed infection existed at some time during the treatment of 3 cases. Aspirated fluid became bacteriologically negative in most cases after one to two weeks. The best treatment for this complication seems to be conservative, provided there is no large bronchopleural fistula.—*Tuberculous empyema complicating artificial pneumothorax, H. J. A. Cranz, Canad. M. A. J., April, 1952, 66: 303.*—(*E. A. Riley*)

Tuberculous Pericarditis.—Three patients with clinically primary tuberculous pericarditis have been treated with streptomycin for 90, 90, and 112 days each, respectively. The duration of fever following admission to the hospital was 13 weeks, as compared with 21 weeks in 4 patients whose pericarditis healed spontaneously without the aid of streptomycin. In the treated cases streptomycin was not given until the patients had been in the hospital 2 weeks or longer. The 3 treated patients are entirely well and leading normal lives at an average of 28 months after the cessation of fever. Of 9 patients with clinically primary tuberculous pericarditis not treated with streptomycin, 5 died of miliary spread of the tuberculosis or of cardiac failure within a few months. Spontaneous healing of the pericarditis occurred in the other 4, but after an average asymptomatic period of 16.5 months tuberculosis appeared elsewhere in the body (Authors' summary).—*Tuberculous pericarditis, its treatment with streptomycin and some observations on the natural history of the disease, T. M. Myers & M. Hamburger, Am. J. Med., March, 1952, 12: 302.*—(*T. H. Noehren*)

Intrabronchial Perforations. — Intrabronchial perforations from tuberculous mediastinal lymph nodes were formerly considered to be usually fatal. At present the prognosis is better, in part, because of better methods of studying the condition. Bronchial fistulas developed in the course of primary tuberculous infection in 55 cases in Lyons. Caseous nodes were formed most frequently during primary infections, which often ran an asymptomatic course. Only 30 per cent of the patients who developed fistulas had symptoms during the primary tuberculosis; some had erythema nodosum, more had influenza. The percentage of persons with primary infection who develop glands which open into the bronchi could not be determined exactly. Among 7,025 recruits, Bouche found 125 suspected of primary infection; 17 had fistulas and 12 had scars of fistulas. Fistulas seemed to be found more frequently in children less than six years old. In adults, overwork seemed to predispose to the condition. The invasion of the bronchus, contrary to former opinion, was often hardly noticed. Occasionally, the earliest indication was the finding of a healed scar. The general condition of the patient usually was good, and there were serious complications, like tuberculous bronchopneumonia and serofibrinous pleurisy, in less than 25 per cent of the cases. Roentgenographically, lesions were seen twice as frequently on the right side as mottled or homogeneous shadows. The mottled shadows were cast by nodules of variable size in the area of one or several bronchi. In anteroposterior films, these shadows were in the same subclavicular location as an early nodular infiltration, but lateral films and tomograms showed them to be hilar. The homogeneous shadows may have resulted from pressure on a bronchus by glands which had not perforated or from rupture of the gland into the bronchus. Whether the shadows were mottled or homogeneous, the course of uncomplicated cases, constituting 75 per cent of the series, was favorable even if purulent, caseous material was emptied into a bronchus. Among the 55 cases, there were only 6 deaths; 2 of them were in young infants who became asphyxiated as a direct consequence of the discharge. Streptomycin and collapse therapy were used

only if the response to rest alone was poor.—*Les perforations intrabronchiques des adénopathies tuberculeuses, J. M. Romain, Acta tuberc. belg., February, 1952, 43: 39.*—(*A. T. Laird*)

Relapse Following Intracavitary Drainage.—Monaldi intracavitary drainage was followed by reopening of the cavity in 26 cases among the patients at the Principe di Piemonte Institute between 1946 and 1951. In 13 cases relapse occurred within the first six months after drainage was discontinued; in 7 cases, from six to twelve months afterwards; and in 6 other cases, from one to two years after termination of the therapy. Of the 26 cases, 25 were treated for cavities of the upper lobes. In 5 of these, relapse was observed despite subsequent thoracoplasty. In all but 3 cases, antibiotics had been used with drainage. In 10 of 17 cases examined by bronchography, almost total stenosis of the draining bronchus was observed. Symptoms of relapse were totally absent in some cases; in others, the reopening of the cavity was accompanied by cough, sputum, fever, and hemoptysis. In 10, reappearance of the cavity coincided with signs of pericavitary reactivation; sometimes new foci appeared in other parts of the lungs. All relapses were treated by reinsertion of the drain and by antibiotics, apparently with good results. Relapse occurred as frequently in men as in women. The presence of lesions other than the treated cavity did not influence the relapse rate. More relapses occurred when the treated cavity originated from the fusion of multiple nodules, particularly if bacterial resistance appeared, before termination of drainage and antibiotic therapy. One cause of relapse may have been mechanical when, following cavity closure, part of the draining sinus remained patent after the drain was removed. In such cases, the drain had to be reinserted immediately and left until the sinus closed. It was, therefore, essential to avoid the formation of new spaces outside the cavity and to sterilize, as nearly as possible, the walls of the cavity, the surrounding foci, and bronchi by the use of antibiotics. This was best achieved by instilling streptomycin or *p*-aminosalicylic acid during the final phases of the drainage period and by carefully using these antibiotics earlier.—*La reapertura di caverne trattate con aspirazione endocavitaria, F. De Marco, Arch. tisiol., October, 1951, 6: 874.*—(*A. Mochi*)

Cavity Tamponade. — In Maurer's method of cavernostomy, (*1*) a canal is made between the chest wall and the cavity, (*2*) the cavity is packed with gauze soaked in antibiotics, and (*3*) finally the draining bronchi are closed by diathermo-coagulation. Mixed infection of the stoma and cavity from the outside is prevented by adding penicillin to the tuberculostatic agents for the tamponade. To reduce the emergence of bacilli resistant to tuberculostatic drugs, a 5 per cent solution of *p*-aminosalicylic acid containing penicillin, 250 units per ml., is used for cavity tamponade; amithiozone or Tebazyl, 0.2 gm. per day, is given orally; streptomycin is reserved for recent spreads or intolerance to other drugs. If the mixed infection is due to penicillin-resistant bacteria, aureomycin or terramycin may be substituted for the tamponade. Unlike drugs introduced through the Monaldi catheter or by intracavitary injections, agents on the tampon exert a continuing effect in the cavity and the surrounding lung tissue because they are not coughed out immediately. Suction drainage, which often infects the drainage canal and chest wall, is unnecessary. The stoma in Maurer's method usually remains aseptic, permitting major chest surgery. An open pleural space definitely contraindicates cavernostomy, as does a vital capacity below 1,300 cc. An open stoma in the chest wall makes expiration less effective by diminishing the pressure in the bronchial tree. For the same reason, 2 cavities should not be treated simultaneously. Small cavities, amenable to other forms of treatment, should not be treated by tamponade. In the case of centrally located cavities in the lower two-thirds of the lungs, the possibility of injuring major branches of the pulmonary artery contraindicates cavernostomy. Hemorrhage from

the stoma or from the cavity may be controlled by tamponade with hemostatic remedies. Cavity tamponade may be valuable prior to thoracoplasty or resection of residual cavities. Thoracoplasty or resection may be necessary when repeated attempts at closing the draining bronchi by diathermo-coagulation fail. Direct observation of the walls of the cavity through a thoracoscope during treatment shows gradual clearing, followed by the formation of vascular granulation tissue.—*Die chemotherapeutische Tamponade der Lungenkavernen, G. Maurer, Deutsche med. Wchnschr., November 16, 1951, No. 46: 1423.*—(*L. Molnar*)

Thoracoplasty and Monaldi Drainage.—During the past ten years, 190 patients have been treated with thoracoplasty associated with Monaldi drainage. Many of the cases were operated upon before the introduction of streptomycin. There were 93 cures (49 per cent) and 72 failures; 13 deaths were due to various complications. Air embolism occurred in one case, hemorrhage in 2 cases, infections in 16, progression of tuberculosis in 16, and "pleurolysis" in 5. Failure was shown by: (*1*) a persistent cavity in spite of both procedures; (*2*) on immediate reappearance of the cavity after removal of the drain; and (*3*) the reopening of the cavity at a later date. Of 72 such cases, 17 had subsequent cavernostomy, which was successful in 14. The best indication for association of thoracoplasty with a Monaldi procedure is a large cavity on one side and reduced function and danger of reactivation in the opposite side.—*Indications et modalités techniques du drainage endocavitaire associé à la thoracoplastie, J. Le Tacon, F. Magnin, & Cueillez, Rev. de la tuberc., 1951, 15: 1010.*—(*V. Leites*)

Extrapleural Pneumothorax in Children.—The long-term results were studied in 38 cases of extrapleural pneumothorax performed in children between 1937 and 1949. Of the patients, 60 per cent were girls; 63 per cent were adolescents. The pleural space was obliterated in 91 per cent, and bilateral disease was present in 71 per cent of the cases. The tuberculous process was of long standing in 74 per cent. The degree of collapse varied between 30 and 50 per cent. There were no postoperative deaths and no serious accidents. Fluid, usually serosanguinous and sterile, almost always formed. It lasted only a short time, necessitating from none to 4 aspirations in 82 per cent of the cases. The follow-up revealed 10 deaths, 8 of which occurred in the first two years among the very far advanced cases. Among the survivors, there were 21 excellent results. Thirteen patients were still receiving refills; 14 others had undergone re-expansion. Among the latter, there were 10 excellent results, and the patients were leading a normal life; in 3 cases, the results were mediocre; and, in one case, the results were poor. Complete re-expansion occurred in only 2 cases; in 2 cases, there were slight sequelae. Partial re-expansion took place in the remaining cases. The residual pocket was frequently filled with fluid.—*Sur les résultats éloignés du pneumothorax extrapleural chez l'enfant, P. Lowys & S. Pignet, Rev. de la tuberc., 1951, 15: 1005.*—(*V. Leites*)

Surgery in Pulmonary Tuberculosis.—From 1947 to 1951, there were 41 pneumonectomies, 18 lobectomies, 3 segmental resections, 2 Gebauer operations, 10 pleural pneumonectomies, and 46 decortications. Bronchopleural fistula developed in 6 (8.5 per cent) of the 74 cases, four times after pneumonectomy and twice after lobectomy. All of these patients had cavitary disease and had received large amounts of streptomycin. In 2 cases, reintervention achieved closure of the fistula; one patient recovered, the other was discharged with empyema. The remaining 4 patients died. The authors' recent experience seems to indicate that intravenous *p*-aminosalicylic acid before and during the operation has favorable effect on the postoperative course. Homolateral and contralateral spreads occurred in 4 patients, 2 of whom subsequently showed complete clearing. The postoperative result was dependent on the indications; the best results were seen in cases of isolated

bronchial stenosis, tuberculoma, and lower lobe cavities. Excisional surgery gave mediocre results in patients with cavitary tuberculosis unsuccessfully treated with bed rest, streptomycin, and collapse therapy. In 28 such cases, there were 4 bronchopleural fistulas. There were 41 cures in 46 cases of tuberculous empyema treated with decortication. —*Notre expérience de l'exérèse en tuberculose pulmonaire, H. Metras, M. Warnery, A. Goupil, H. Longefait, & L. Hartung, Rev. de la tuberc., 1951, 15: 982.*—(*V. Leites*)

Air Embolism.—Air embolism complicated pneumoperitoneum treatment in 3 cases. One patient experienced air embolism during induction of his pneumoperitoneum. He recovered completely within forty-eight hours. The second case occurred after the patient had left the table. The patient died immediately, and the autopsy revealed a small hemorrhage subperitoneally and in the abdominal muscles. A large amount of air separated the layers of muscle tissue in an area surrounding a perforated vein. The third case occurred during a routine refill. The patient recovered within a few hours.—*Air embolism in pneumoperitoneum, A. G. Hollander, J.A.M.A., October 6, 1951, 147: 568.*—(*H. Abeles*)

Primary Tuberculous Inoculation of an Ear Lobe.—Primary tuberculous inoculation of an ear lobe followed puncture for earrings in an 18-month-old Puerto Rican child. A piece of string on an ordinary needle was carried through each ear lobe two months before admission to the hospital and left in place for about one week. A month later the mother was hospitalized for active pulmonary tuberculosis. Five days before the infant's admission to the hospital, the father noticed swelling and redness along the right side of the child's neck. The inflammation spread upward behind the right ear. The child became anorexic and feverish. At the time of admission to the hospital, the right ear lobe was swollen, with an ulcerated, crusted lesion in its center. The right cervical lymphadenitis became fluctuant, and tubercle bacilli were found in aspirated pus by smear and culture. The Mantoux test at 1:10,000 was strongly positive. The response to antimicrobial therapy was good.—*Primary tuberculous inoculation of an ear lobe, L. G. Morgan, J. Pediat., April, 1952, 40: 482.*—(*M. J. Small*)

CLINICAL STUDIES, NONTUBERCULOUS DISEASES

Sarcoidosis.—Sarcoidosis most commonly involves the lungs and lymph nodes, although the eyes, skin, bones, liver, and spleen are frequently affected. Analysis of 24 cases of the disease emphasized rheumatic complaints and nervous system involvement. The prognosis was not benign; 3 patients died as a direct result of their disease during the five-year study. No treatment proved of consistent value and none was specific. Streptomycin for 21 to 120 days had no effect in 6 cases; in one patient, hilar and mediastinal lymph node enlargement progressed despite streptomycin. Aureomycin was used in one case without any significant effect. Nitrogen mustard, used in 6 cases, gave no evidence of causing improvement; one patient developed skin lesions shortly after completing a course of nitrogen mustard. Calciferol was used in only one case. The skin lesions became worse before hypercalcemia and hypercalcinuria made it necessary to discontinue therapy. Three patients received roentgen-ray irradiation without any effect. Corticotropin and cortisone eyedrops were used in one case without effect on the pulmonary lesions. The eye lesions seemed to respond slowly, but this may not have been due to the treatment. —*Sarcoidosis, a review with twenty-four additional cases, B. R. Gendel, J. M. Young, & D. J. Greiner, Am. J. Med., February, 1952, 12: 205.*—(*T. H. Noehren*)

"Snowball" Lesions in Sarcoidosis.—The great variety of roentgenographic manifestations of pulmonary sarcoidosis may be due in part to the various phases of the disease. The common distinct types of lesion are (*1*)

diffuse miliary or nodular forms, (*2*) linear or reticular striations, and (*3*) localized or pneumonic infiltrates. A further form is exhibited by 2 proved cases of pulmonary sarcoidosis in which large parenchymal nodules are indistinguishable from the "snowball" lesions of metastatic malignancy.—*Pulmonary sarcoidosis with the roentgenologic appearances of metastatic neoplasm: A report of two cases, M. C. McCord & H. L. Hyman, Am. J. Roentgenol., February, 1952, 67: 259.*—(*T. H. Noehren*)

Intestinal Hemorrhage in Sarcoidosis.—A 59-year-old man had sarcoidosis for at least five months. The initial stage was characterized by lymphadenopathy and splenomegaly. Repeated massive gastrointestinal hemorrhages were noted during the last month of life and did not respond to transfusion therapy. Necropsy disclosed generalized sarcoidosis involving the spleen, lungs, liver, and mediastinal and mesenteric lymph nodes. The site of the gastrointestinal bleeding was not discovered at necropsy. In addition, there were extensive petechial hemorrhages in the kidneys. This case is presented as one of hypersplenism caused by sarcoidosis involving the spleen, with probable resultant thrombocytopenia and extensive hemorrhagic manifestations. On the basis of the present and other reported cases in the literature it is suggested that, when otherwise unexplained hemorrhage occurs during the course of Boeck's sarcoid, serious consideration should be given to the performance of splenectomy (Authors' summary).—*Massive gastrointestinal hemorrhage in a case of Boeck's sarcoid, E. B. Blum & N. Mitchell, Ann. Int. Med., January, 1952, 36: 185.*—(*T. H. Noehren*)

Myocardial Sarcoidosis.—In a case of generalized sarcoidosis there was massive involvement of the myocardium and partial involvement of the auriculoventricular bundle. The sarcoidosis may be related in this case to a fifteen-year history of carotid sinus syncope.—*Boeck's sarcoid with complete heart block mimicking carotid sinus syncope: Report of a case, S. Simkins, J.A.M.A., June 30, 1951, 146: 794.*—(*H. Abeles*)

Cortisone for Sarcoidosis.—Cortisone was administered to 13 patients with sarcoidosis for periods of 28 to 106 days. Some objective and subjective improvement occurred in all. Fresh lesions appeared to be more responsive than older ones. Of 10 patients whose therapy had been terminated, 7 showed relapse. Thirteen post-treatment biopsy specimens from 8 patients were available for comparison with specimens removed prior to treatment. Ten specimens showed slight to marked regressive changes histologically (Author's summary).—*Effects of cortisone in sarcoidosis: A study of thirteen patients, L. E. Siltzbach, Am. J. Med., February, 1952, 12: 139.*—(*T. H. Noehren*)

Cortisone for Sarcoidosis.—Four patients with sarcoidosis were treated with cortisone. Regression of the pulmonary, and disappearance of the lymph node and cutaneous, manifestations of the disease occurred. The disappearance of cough, expectoration, and dyspnea and the objective improvement on pulmonary function tests were dramatically rapid. On follow-up observations, one patient showed a recurrence of the pulmonary lesions after seven months. Another patient developed tuberculosis of the spine. The 2 remaining patients are well without evidence of recurrence, but one of them has roentgenographic manifestations of emphysema and fibrosis.—*Favorable response of sarcoidosis to cortisone treatment, M. J. Small, J.A.M.A., November 3, 1951, 147: 932.*—(*H. Abeles*)

Cortisone for Sarcoidosis.—Two patients suffering from sarcoidosis were treated with cortisone. Both patients showed significant clearing of intrathoracic lesions within six days; in one of the 2 patients the clearing was almost complete. The very rapid clearing of the pulmonary lesions suggests that they were of the nature of a granuloma without organization or a purely exudative infiltrate.—

Cortisone therapy of Boeck's sarcoid, F. J. Lovelock & D. J. Stone, J.A.M.A., November 3, 1951, 147: 930.—(H. Abeles)

Cortisone for Sarcoidosis.—A 30-year-old Negro woman with severe bilateral ocular involvement and enlargement of mediastinal lymph nodes due to sarcoidosis was treated with intramuscular cortisone for fifteen weeks. The ocular lesions had progressed during eight months in spite of conventional treatment so that the patient was almost blind. Vision improved from the first day of cortisone treatment. Mediastinal lymph node shrinkage began on the tenth day, and after one month there was only residual enlargement of the nodes. A mild exacerbation of the uveitis occurred three weeks after intramuscular therapy was discontinued, but topical therapy in the form of cortisone eye drops promptly controlled it. The patient's vision improved to 76 per cent of normal binocular vision.—*Cortisone therapy in sarcoidosis; effect in a case with virtual blindness, L. E. Siltzbach, A. Posner, & M. M. Medine, J.A.M.A., November 3, 1951, 147: 927.—(H. Abeles)*

Histoplasmosis and Sarcoidosis.—Histologically, histoplasmosis resembles sarcoidosis; cases considered clinically and pathologically to be the latter may occasionally be chronic histoplasmosis. A white man from Ohio first developed respiratory symptoms in 1942 at the age of thirty; roentgenograms showed bilateral pulmonary infiltration. Sarcoidosis was diagnosed in 1947 on the basis of a cervical lymph node biopsy, negative tuberculin test, and hyperglobulinemia. He was generally well until 1948, when he had a sore throat and hoarseness with edema and ulceration of the larynx. *Histoplasma* was found in a laryngeal biopsy specimen; cultures of *Histoplasma capsulatum* were obtained from the larynx, pharyngeal ulcers, and sputum. Another cervical lymph node biopsy showed typical sarcoidosis; *Histoplasma* could not be demonstrated. Clinical improvement followed six months' bed rest and courses of streptomycin and bacillomycin. *Histoplasma* could no longer be cultured. In 1950, laryngeal obstruction became marked, requiring a tracheotomy. Cortisone therapy had no apparent effect. Histoplasmosis was sought in 22 other patients considered to have sarcoidosis on the basis of clinical, laboratory, and biopsy evidence. Complement fixation and collodion agglutination tests were negative except for one of the 19 patients so tested. This one had a negative complement fixation test but a four plus collodion agglutination test in titer of 1:10. Although this was considered suspicious, the patient's histoplasmin skin test was negative, and detailed clinical and laboratory study failed to discover histoplasmosis. It is concluded that histoplasmosis infrequently is a factor in patients with sarcoidosis in Philadelphia, but the former should be sought in patients with apparent sarcoidosis who have resided in the Missouri, Tennessee, or Ohio valleys and who have oral, laryngeal, or adrenal involvement.—*Chronic disseminated histoplasmosis: An investigation of its relationship to sarcoidosis, H. L. Israel, E. DeLamater, M. Sones, W. D. Willis, & A. Mirmelstein, Am. J. Med., February, 1952, 12: 252.—(T. H. Noehren)*

Histoplasmosis.—Two brothers, six and three years old, respectively, had abnormal chest findings on survey examinations. The older boy had scattered calcific infiltrations throughout both lung fields, while the younger one had a large left paratracheal density. Both boys had spent six weeks in Mississippi eighteen months prior to the survey examination in New York City. While in Mississippi they were acutely ill and were treated for malaria. The older boy had a chest film taken upon return to New York which showed fuzzy infiltrations throughout both lung fields. Both children had negative tuberculin skin tests and positive histoplasmin skin tests. The complement fixation test for histoplasmosis was positive in the boy with the calcific lesions while it was negative in the one with the large paratracheal density.—*Benign*

histoplasmosis in siblings: Report of cases, I. R. Miller & S. Grossman, J.A.M.A., October 20, 1951, 147: 753.—(H. Abeles)

Nocardiosis.—Three new cases of nocardiosis are added to the 43 previously recorded. In the three cases, there were 2 fatalities; one patient is asymptomatic after four years. One of the fatal cases was associated with pre-existing anthracosilicosis. *Nocardia asteroides* has been the most frequent organism. The clinical course often was that of a respiratory disease, frequently simulating pulmonary tuberculosis. Anorexia, malaise, weight loss, night sweats, fatigue, chills, fever, and a chronic cough productive of foul green sputum were common. Hemoptysis occasionally occurred. In a few cases, subcutaneous abscesses and sinuses or brain abscess appeared without pulmonary symptoms. Hepatomegaly and splenomegaly, alimentary and urinary tract abnormalities occurred late in widely disseminated infections. Chest roentgenograms resembled those of other granulomata. Usually, the lungs were primarily involved or pulmonary metastasis occurred early. Caseous bronchopneumonia eventually produced cavities, and there usually was hematogenous dissemination with abscess formation in the brain, liver, spleen, kidney, adrenals, intestinal wall, muscles, subcutaneous tissue, and skin. Pulmonary lesions frequently extended to the pleura, giving rise to empyema. The presence of old lesions suggests that the disease may have been localized for as long as fifteen years. Microscopically, the lesions of nocardiosis had a necrotic center surrounded by dense cellular fibrous tissue, fibrin, leukocytes, plasma cells, and macrophages, with branching fungi throughout the tissue. "Granules" occasionally appeared as amorphous lobulated masses of delicate tangled hyphae. In treating *N. asteroides*, sulfadiazine and sulfamerazine seemed to be the most active and safest agents. Penicillin has been found to inhibit the organism; streptomycin has been toxic in the required concentration. Aureomycin, terramycin, and chloramphenicol have not been evaluated. At this time, sulfadiazine should be used with any antibiotic which is effective *in vitro*.—*Nocardiosis: Three case reports, I. L. Bernstein, J. E. Cook, H. Plotnick, & F. J. Tenczar, Ann. Int. Med., March, 1952, 36: 852.—(T. H. Noehren)*

Pulmonary Aspergillosis.—A middle-aged woman was treated with penicillin, streptomycin, and chloramphenicol for a post-influenzal bronchopneumonia. Despite adequate doses of these antibiotics, her clinical course was down hill. After eleven days of therapy, a chest roentgenogram revealed cavitary disease, and shortly thereafter the patient died. At autopsy, an abscess of the left upper lung lobe was found and material from it yielded a heavy growth of *Aspergillus fumigatus*. Histologic sections revealed the abscess cavity to be lined with a densely felted layer of fungal mycelium and occasional conidia. Fragments of mycelium were found in the lung tissue throughout the upper and lower lobes, which were the sites of a hemorrhagic fibrinous consolidation. Sections from the right lung showed bronchopneumonic consolidation of the lower lobe, with fragments of mycelium in the exudate filling some bronchioles. It was believed that the use of antibiotics predisposed the damaged lung to infection with *Aspergillus fumigatus* and illustrates one of the dangers of antibiotic therapy.—*Pulmonary aspergillosis following post-influenzal bronchopneumonia treated with antibiotics, J. D. Abbott, H. V. J. Fernando, K. Gurling, & B. W. Meade, Brit. M. J., March 8, 1952, No. 4757: 523.—(E. A. Riley)*

Blastomycosis.—A 21-year-old pregnant woman had skin and lung lesions due to *Blastomyces dermatitidis*. She was treated with iodides, *B. dermatitidis* vaccine, and roentgenotherapy of the skin lesions. There was complete clinical recovery, although the intradermal reaction to *B. dermatitidis* vaccine and the complement fixation test remained positive. Passive transfer of complement-fixing antibodies from the mother to the infant was demonstrated immediately after birth; the

antibodies disappeared from the infant's blood within three months.—*Systemic blastomycosis complicated with pregnancy: Report of a case, with clinical course and immunologic reactions, R. O. Noojin & H. B. Praytor, J.A.M.A., October 20, 1951, 147: 749.—(H. Abeles)*

Treatment of Hydatid Cysts.—A series of 229 intrathoracic hydatid cysts were studied in Uruguay. Of these, 190 were pulmonary, 18 hepatopulmonary, 8 secondary pleural implants, 5 hydatid pyopneumothoraces, 5 in the ribs or dorsal spine, and 3 cardiopericardial. As to anatomical types, the distribution was as follows: 81 unilocular hyaline cysts, 75 alveolar cysts, and 34 hydatid sequelae. These sequelae were further subdivided as follows: 17 bronchiectasis, 15 residual cavities, and 2 hydatid granulomata. The management of these *Echinococcus* cysts was undertaken with the 2 principal dangers attendant on the handling of these lesions in mind: (*1*) seeding by spillage of the hydatid fluid, and (*2*) allergic and anaphylactic reactions also related as a rule to absorption of fluid from spillage during surgical manipulation. Treatment in all of the 190 cases of pulmonary hydatid cysts was surgical. With the exception of 6 cases, an open thoracotomy was performed in all. The procedures employed were: enucleation of the cyst in 78, extraction of the parasitic rests in 51, lobectomy in 41, excision of cysts and atypical resection in 10, and pneumonectomy in 4. The other 6 cases underwent only a minimal thoracotomy and marsupial drainage of the cyst because the pleura was adherent. There were 2 deaths in the entire series, one in a case of cyst excision and the other in a minimal thoracotomy and drainage due to late hemorrhage.—*Tratamiento del quiste hidático del pulmón, V. Armando Ugón, Hoja tisiol., December, 1951, 4: 369.—(F. Pérez-Pina)*

Pneumonia.—Since the introduction of antibiotics, many pneumonias caused by viruses and Rickettsia have been revealed. Of 159 cases of non-bacterial pneumonia investigated serologically, 34 were influenzal in origin, 22 were probably of the same etiology, 22 were classified as primary atypical pneumonia, 2 fell into the psittacosis-ornithosis group, and 79 were unclassified. Cases of primary atypical pneumonia showed a cold agglutinin titer of 1:16 or over. The influenzal cases showed an increase in the influenzal antibody titer between the acute and convalescent phases. If a significantly high titer was found in only the convalescent stage, the case was considered as probably influenzal. No influenza-positive case showed cold agglutinins and no case with cold agglutinins showed a positive influenza complement fixation reaction.

Other viral pneumonias were often clinically indistinguishable from the influenzal cases although the tendency of the latter group to be secondarily infected with *M. pyogenes*, var. *aureus* was evident. Only one case in this series fulfilled the criteria for acute fulminating lobar pneumonia. It was readily apparent that the influenzal cases could not be separated from noninfluenzal disease by physical signs, roentgenographic findings, or leukocyte counts. Although no great difference was found between the influenzal and unclassified groups, pleural effusion was less common in the cold-agglutinin-positive cases. Only one case of empyema and 24 cases of clear sterile pleural effusions were found. Some patients with primary atypical pneumonia showed a marked tendency to develop hemolytic anemia. The uniformity of the clinical findings of these groups without significant bacterial infection emphasizes that the problem of these infections can be solved only with the help of the virus expert and the wider employment of various serologic tests.—*The clinical feature of the pneumonias undergoing virus tests, G. H. Jennings, Brit. M. J., January 19, 1952, No. 4750: 123.—(E. A. Riley)*

Enzymes for Unresolved Pneumonia.—A 75-year-old white woman was diagnosed as having pneumonia with atelectasis of the left lower lobe. *D. pneumoniae* group C was cultured from her sputum and blood. Repeated

bronchoscopies revealed edematous and reddened bronchial mucosa, and large quantities of thick purulent material were removed from the left lower lobe bronchus without complete disappearance of pneumonic infiltration. She never produced significant amounts of sputum, and penicillin had no demonstrable effect. One month after admission, bronchoscopy showed no edema, injection, or pus. Through the bronchoscope, 20,000 units of streptokinase and 9,500 units of streptodornase in 5 cc. of saline solution were instilled into the secondary bronchi of the left lower lobe. She then lay on her left side. After four hours, she coughed up progressively increasing amounts of thin, colorless sputum. A second instillation of 50,000 units of streptokinase and 19,000 units of streptodornase produced identical results, except that there was fever to 100° F. approximately six hours after the drug was given. The next day, breath sounds were strikingly improved and the rales were greatly decreased in the affected area. Serial chest roentgenograms showed progressive clearing, and the patient was discharged three weeks after treatment. The enzymes probably liquefied the fibrinopurulent material occluding the smaller bronchi of the left lower lobe, permitting the segments to drain and reexpand. Although no untoward reactions were noted, larger endobronchial doses may prove to be harmful.—*Treatment of unresolved pneumonia with streptokinase and streptodornase, J. J. Muenster, I. J. Flance, & B. Sweeney, Am. J. Med., March, 1952, 12: 376.*—(*T. H. Noehren*)

Fibrosis Secondary to Pneumonia.—Microscopic examination of lungs from necropsies performed during the past four years has shown organization in pulmonary exudates to be significantly more frequent than previously. Pulmonary fibrosis of some type and degree has been common and further studies were restricted to the organization of "pneumonia" exudate, specifically to pulmonary fibrosis secondary to pneumonia presumably caused by exogenous infectious agents. In such cases, resolution would be expected. As exceptions, 7 cases of proliferative reaction of unknown cause occurring in the lungs of patients dying in renal failure were also studied. To obtain comparable series and to assess the role of the antibiotics, 100 necropsies each from 1940 (group II) and from 1930 (group III) were reviewed. Group I consisted of 307 necropsies from the past four years. Organization in the restricted sense was reported in approximately 12 per cent of the cases in group I, in 7 per cent of those in group II, and in 5 per cent of those in group III. Two factors may contribute to this increasing incidence: the etiology and the therapy. During the past decade, viral pneumonia has increased, and it has been suggested that it may be the underlying disease in most bacterial pneumonias, including pneumococcal pneumonia. Antibacterial therapy had been used in many of the cases in group I. There is evidence that alteration of the flora by antibacterial treatment may have affected adversely the natural resolution of exudates due to pneumococci. Antibacterial agents may alter the host response by affecting the causative organism. Exudates which are rich in fibrin and poor in polymorphonuclear leukocytes are more likely to organize, for fibrinolysis is carried on by enzymes from these leukocytes. In most of the recent cases there were few polymorphonuclear leukocytes in the involved areas and the predominant cell was the monocyte. The significance of uremia as a cause of "pneumonia" accompanied by fibroplasia is unknown. The occurrence of left ventricular failure was the principal common feature in the 7 cases of "uremic pneumonia."—*Pulmonary fibrosis secondary to pneumonia, S. H. Auerbach, O. M. Mims, & E. W. Goodpasture, Am. J. Path., January–February, 1952, 28: 96.*—(*J. S. Woolley*)

Diffuse Interstitial Fibrosis.—Diffuse interstitial pulmonary fibrosis as described by Hamman and Rich is characterized by the sudden onset of dyspnea, cough, cyanosis, and fever, with early cardiac decompensation. The findings in a 44-year-old woman are included with 13 previously recorded cases to

comprise a group of 6 men and 8 women, ranging in age from 21 to 68 years. Outstanding among the symptoms were cough, variable degrees of expectoration, occasional hemoptysis, chest pain, fever, increasing dyspnea, and cyanosis. The onset was insidious in a few patients, but in most it was acute. The appearance of dyspnea and heart failure led to progressive worsening; death occurred from suffocation or cardiac decompensation. The shortest course from the onset of the final illness was thirty-one days; the longest, three and a half years. The physical and laboratory findings were in the main uninformative, and the symptoms were often much more marked than the objective findings. Several patients had digital clubbing. The roentgenographic findings were not distinctive although cardiac enlargement was usually present. Frequently, miliary, nodular, or mottled infiltrations involved both lungs diffusely, often associated with conglomerate areas of consolidation and occasionally with pleural effusion terminally. The post-mortem findings were fairly uniform, with diffuse interstitial fibrosis of both lungs; hyalinized connective tissue replaced the thick alveolar septa. The different stages of the fibrotic reaction in various parts of the lungs indicate that the disease is progressive. Cardiac enlargement, entirely or chiefly of the right side of the heart, was almost always present. The etiology is unknown; influenzal pneumonia, chemical irritants, and hypersensitivity to various agents have been suggested. The condition seems to behave like a pneumonia and histologically resembles influenzal pneumonia with a characteristic alveolar hyaline membrane in many cases. The disease progresses slowly over months or years, and may cause fibrosis of the bronchi and blood vessels with intimal thickening of the arteries and, at times, obliteration of the lumina. These vascular changes may be part of the disease or secondary to pulmonary hypertension. Associated emphysema, bronchiectasis, and/or vascular damage may result in the loss of the disease's "classic" features. Diffuse interstitial fibrosis may not always be fatal but the diagnosis can be proved only by histologic study of the lungs.—*Diffuse interstitial fibrosis of the lungs, E. H. Rubin, B. S. Kahn, & D. Pecker, Ann. Int. Med., March, 1952, 36: 827.—(T. H. Noehren)*

Pancreatic Cyst with Hydrothorax.—A case of hydrothorax was associated with pseudocysts of the pancreas. Hydrothorax associated with pseudocysts of the pancreas is apparently uncommon because search of the literature failed to reveal more than 6 cases in which an inflammatory component could be ruled out. The mechanism concerned with the passage of material from the abdomen to the pleural cavity by means of transdiaphragmatic lymphatics is well known and, of all the theories postulated, the most credible one appears to be that which explains the formation of the fluid as a result of either: (*1*) passage of an irritative substance, such as a pancreatic ferment, through the diaphragmatic lymphatics to the pleural cavity where an irritative pleural effusion is set up, or (*2*) transperitoneal passage of ascitic fluid into the pleural cavity through the physiologic diaphragm openings (Authors' summary).—*Pseudocyst of the pancreas associated with hydrothorax, R. J. Gross, R. Null, & W. Loeb, Am. J. Roentgenol., April, 1952, 67: 585.—(T. H. Noehren)*

Lung Lesions in Hand-Schüller-Christian Disease.—A 6-year-old child, said to be the first typical case of Hand-Schüller-Christian disease recorded from Egypt, presented the typical triad of symptoms: exophthalmos, diabetes insipidus, and typical radiologic findings in the skull. Radiologic evidence of fibrosis in both lung bases was also present. Lung changes leading to fibrosis in this disease were described by Rowland in 1926. There may be mottling like that in miliary tuberculosis; in fatal cases diffuse secondary fibrosis may lead to cor pulmonale and heart failure. This patient had had the disease for three years and was still alive. The polyuria was well controlled by pitressin; thyroid extract appeared to have no effect.—*Hand-Schüller-Christian syndrome: Report of*

case, A. A. El Gholmy & B. El Sebai, Arch. Pediat., March, 1952, 69: 108.—(M. J. Small)

Pulmonary Hemangioma.—Eight patients were seen with pulmonary hemangioma, also called cavernous hemangioma of the lung, arteriovenous aneurysm, or pulmonary arteriovenous fistula. Their ages ranged between 32 and 79 years; there were 4 men and 4 women. In one-half of this group, the characteristic signs of clubbing, cyanosis, and polythemia were not present. Conventional chest roentgenograms showed an abnormal shadow in the lungs. There are usually two or more sinuous, linear shadows connnecting the mass with the hilum; they represent the dilated afferent and efferent blood vessels. The Valsalva and the Müller maneuver help in establishing the vascular character of the lesion. Pulsations were demonstrated fluoroscopically and by roentgen kymography in 2 cases. Laminagraphy is very helpful. Angiocardiography should be done in every case in which surgical treatment is contemplated; it may reveal lesions otherwise not suspected.—*Roentgen aspects of pulmonary arteriovenous fistula, W. B. Seaman & A. Goldman, A. M. A. Arch. Int. Med., January, 1952, 89: 70.—(G. C. Leiner)*

Pulmonary Infarction.—In 5 cases of thrombophlebitis of the upper extremity, pulmonary embolism occurred. The thrombosis was secondary to chemical irritation in 2 cases, was unknown in one case, and was probably traumatic in the fifth case. All received anticoagulant therapy and the embolism was controlled satisfactorily in 2 of the 5 patients. One patient died from repeated pulmonary emboli originating in the right axillary, brachial, and subclavian veins, and multiple pulmonary infarctions were demonstrated at post-mortem examination.—*Pulmonary infarction complicating thrombophlebitis of the upper extremity, C. E. Tomlin, Am. J. Med., April, 1952, 12: 411.—(T. H. Noehren)*

Cerebral Circulation in Emphysema.—Reduced arterial oxygen tension or elevated carbon dioxide tension, produced by altering the composition of the inspired air, dilate the cerebral blood vessels in man and increase cerebral blood flow. Similar changes in blood gas tensions commonly occur in advanced chronic pulmonary emphysema. The administration of oxygen to overcome the anoxemia has caused reactions in approximately 10 per cent of such patients. These reactions included convulsive seizures, drowsiness, stupor, coma and, in rare instances, death. The cerebral blood flow (CBF), oxygen consumption ($CMRO_2$), and vascular resistance (CVR) were determined by the nitrous oxide technique before and during the administration of 85 to 100 per cent oxygen to 9 patients with chronic pulmonary emphysema and to 8 control subjects. In the patients with emphysema the mean CBF was significantly elevated, while the mean $CMRO_2$ was slightly below control values. There was a tendency for the emphysematous patients with the lowest arterial pO_2 and the highest pCO_2 values to show the highest blood flow values. The converse was also true. Inhalation of 85 to 100 per cent oxygen was generally followed by an increased CBF in the patients with emphysema in contrast to the control patients in whom the CBF decreased. Two emphysematous patients who had the lowest CBF values while breathing air showed a decrease in CBF during inhalation of oxygen. The mean $CMRO_2$ did not change in either group of patients with oxygen administration. One patient with emphysema exhibited mental aberrations which may have been aggravated by oxygen therapy. Oxygen caused an increase in spinal fluid pressures in the patients with emphysema and either no change or a fall in spinal fluid pressures in the control subjects. Oxygen inhalation caused a depression of pulmonary ventilation in the patients with emphysema and resulted in a rise in arterial pCO_2 and a fall in pH. The moderate increase in pCO_2 and decrease in pH apparently more than offset the large increase in pO_2

and thus brought about a rise in cerebral blood flow.—*Cerebral circulation and metabolism in chronic pulmonary emphysema, with observations on the effects of inhalation of oxygen, J. L. Patterson, Jr., A. Heyman, & T. W. Duke, Am. J. Med., April, 1952, 12: 382.*—(*T. H. Noehren*)

Treatment of Pulmonary Emphysema.—In 21 patients with pulmonary emphysema, a significant fall in the resting pulmonary ventilation was observed while they breathed 100 per cent oxygen. This decrease in the minute ventilation offered an explanation for the elevation in the arterial carbon dioxide concentration. Four patients in this group exhibited mental changes, accompanied by a marked increase in the arterial carbon dioxide tension and an acid shift in the blood pH. Analysis of previously published data, as well as the results of these studies, would seem to indicate that respiratory acidosis is the critical factor in the alteration in mental function, rather than carbon dioxide retention without acidosis. These studies confirm the desirability of a program of oxygen treatment in which the percentage of oxygen administered is gradually increased over a period of a week or ten days in order to prevent respiratory acidosis and mental changes. Spirographic studies following the oral administration of aminophylline indicate that this drug is of value in the treatment of bronchospasm in the majority of patients with pulmonary emphysema, provided it is administered on an empty stomach. An increase of 45.8 per cent in maximal breathing capacity was demonstrated one hour after ingestion in 15 patients. The beneficial results of inhalation of nebulized epinephrine, particularly 2.25 per cent synthetic racemic epinephrine, were confirmed in this study (Authors' summary).—*Physiologic factors in the treatment of chronic hypertrophic pulmonary emphysema, H. A. Bickerman & G. J. Beck, Ann. Int. Med., February, 1952, 36: 607.*—(*T. H. Noehren*)

Pulmonary Function in Poliomyelitis.—The pulmonary function was studied in 12 patients convalescing from acute poliomyelitis with varying degrees of respiratory paralysis. Lung volume analysis revealed reduction of vital capacity in all but one instance. Residual volume was increased from 125 to 280 per cent in all but 2 subjects. The expiratory reserve volume was decreased by an average of 540 cc. The increased residual volumes were associated with paralysis of muscles effecting forced expiration and did not represent structural emphysema. Maximum breathing capacity was below normal but in general was relatively better preserved than vital capacity, with which it correlated poorly. The pattern of mixing and diffusion of gases in the lungs was normal, but alveolar ventilation was inadequate in 5 of the moderately and severely paralyzed patients, as indicated by low oxygen and elevated carbon dioxide tensions in the alveoli and the arterial blood. There was no evidence that poliomyelitis per se or mechanical respirators acting on a cyclic negative pressure principle produced any physiologically significant intrapulmonary defects. The state of the respiratory musculature of every patient recovering from poliomyelitis should be determined because slight but important degrees of paralysis may not be recognized. Fluoroscopy of the chest and vital capacity are simple and reliable methods for this evaluation (Authors' summary).—*Pulmonary function in patients convalescing from acute poliomyelitis with respiratory paralysis, D. S. Lukas & F. Plum, Am. J. Med., April, 1952, 12: 388.*—(*T. H. Noehren*)

Khellin as a Bronchodilator.—Khellin, an extract from the juice of the plant *Ammi visnaga* Lam, has long been employed in the Middle East for the relief of renal colic. Recent reports have indicated its value as a coronary dilator, a bronchodilator, an antispasmodic. In a previous report 8 patients with clinical cor pulmonale received the drug and showed marked improvement in dyspnea, cyanosis, capacity for exercise, and general well-being.

In order to evaluate this improvement objectively, cardiopulmonary investigations were undertaken using cardiac catheterization and bronchospirometry. Six patients with chronic pulmonary disease were studied at rest and after exercise, before and after eight days of daily oral Khellin therapy. No consistent change in ventilation, oxygen uptake, oxygen removal, cardiac output, or pulmonary arterial pressure resulted from the therapy. However, there was a consistent rise in maximum breathing capacity in the 4 patients on whom this data was available; there was a mean increase of 15 liters per minute. This was accompanied by some subjective improvement. It is felt that the action is principally bronchodilatation. There is a disparity between these results and those of others which would justify the investigation of a larger series of patients.—*The effect of Khellin on cardio-pulmonary function in chronic pulmonary disease, E. Silber, G. Snider, L. Katz, & D. Radner, J. Clin. Investigation, October, 1951, 30: 1046.*—(*S. Hadley*)

Mycosis Fungoides.—Mycosis fungoides is a disease of the reticuloendothelial system, manifesting itself primarily in the skin although visceral lesions are frequent. Little consideration has been given to lung involvement in mycosis fungoides. Chest roentgenograms typically show early noncharacteristic hilar enlargement. The lesions then spread along the vessels and manifest roentgenographically by increased streaking. Later, tumorous changes occur, small nodules appearing along the vessels and bronchi so that the picture resembles bronchopneumonia or lymphangitis carcinomatose. These changes are characteristic in that the apices remain free until the end. In 3 of 4 cases of mycosis fungoides with pulmonary lesions, the findings were verified at autopsy. The fourth case showed clearing of the pulmonary pathology following nitrogen mustard and radioactive phosphorus therapy.—*Pulmonary manifestations of mycosis fungoides, S. M. Bluefarb & H. S. Steinberg, Ann. Int. Med., February, 1952, 36: 625.*—(*T. H. Noehren*)

Pulmonary Adenomatosis.—A clinical diagnosis of pulmonary adenomatosis should be suspected in cases with (*1*) a chronic pulmonary disease in which there are repeated attacks of acute pneumonia, (*2*) a nonspecific patchy or homogeneous infiltration on the roentgenogram, and (*3*) the production of a large amount of thin, watery, mucoid, "soapsuds-like" sputum. One case presented unusual findings: (*1*) roentgenographic changes in the lungs two years prior to death, (*2*) the presence of large, faintly stained homogeneous bodies in the cytoplasm of many of the alveolar lining cells, and (*3*) the hypertrophy of the islet cells of the pancreas, with a tendency toward acinar formation. Demonstrable roentgenographic changes in the lungs two years prior to death have not been previously reported. The latter two findings have each been previously reported in single cases.—*Pulmonary adenomatosis, J. M. Dennis, W. T. Raby, E. J. C. Hildenbrand, Ann. Int. Med., February, 1952, 36: 667.*—(*T. H. Noehren*)

Pneumothorax in a Newborn.—A difficult labor in a primipara under ether anesthesia requiring version and forceps resulted in the birth of a 3,950 gm. male infant. The newborn's respirations were delayed but were eventually established following oxygen inhalations, lobeline, a warm bath, and vitamin K. The oxygen inhalations were given with a small "resuscitator". The exact oxygen pressures used are not known. Six hours later the infant's condition remained poor, with cyanosis, tachypnea, shock, and tachycardia. The cyanosis was diminished by an oxygen tent, but returned as soon as the infant was removed from it. A lumbar puncture was negative. Twenty-five hours after birth the signs and symptoms of respiratory distress were worse. There were basal subcrepitant rales over the left lung. A roentgenogram of the chest showed a right-sided pneumothorax, shift of the mediastinum to the left, and marked compression of the left lung. A needle was introduced into the right fifth intercostal space, and underwater decompression for

twenty-four hours was effected. The infant's subsequent course was uneventful. Obstetrical trauma, excessively strenuous efforts at artificial respiration, as well as oxygen insufflation of the lungs without control of its pressure are the most common causes of this grave complication in the newborn. The outstanding symptoms are dyspnea and cyanosis followed by shock, and these may develop either gradually or very rapidly.—*Neumotórax en un recién nacido, B. Delgado Correa & J. C. Barani, Hoja tisiol., September, 1951, 3: 239.—(F. Pérez-Pina)*

Hemopneumothorax.—Spontaneous pneumothorax is relatively common, but its complication by hemorrhage is thought to be unusual. Of 54 cases, 14 were fatal, 11 dying within twenty-four hours although one survived for thirty-six days. At autopsy, the chest contained 1.0 to 4.5 liters of blood with few clots. The source of bleeding was located in one-half of the cases; 5 had torn pleural adhesions. Treatment generally consisted of removing some blood for diagnostic purposes and later removing more if mediastinal displacement embarrassed the circulation or caused distressing dyspnea. Air was injected to maintain the pneumothorax and to prevent a sudden alteration of the intrapleural pressure. Shock was treated with transfusions. A surgical search for the bleeding point was made only if the bleeding continued. The mortality from spontaneous hemopneumothorax is approximately 25 per cent. The conservative treatment described may not suffice for massive bleeding. Seven of the cases demonstrate that immediate thoracotomy may control the bleeding and prevent fibrothorax. At present, hemopneumothorax should be treated by: (*1*) promptly aspirating both blood and air to facilitate pulmonary re-expansion, using frequent roentgenograms to determine when to reaspirate; (*2*) operating early for continued bleeding; (*3*) using streptokinase and streptodornase to remove residual clots and fibrin; and (*4*) decorticating the lung promptly if an organizing hemothorax interferes with pulmonary re-expansion.—*Hemopneumothorax: Re-evaluation of treatment, G. A. Beatty & R. W. Frelick, Ann. Int. Med., March, 1952, 36: 845.—(T. H. Noehren)*

Chylothorax.—In a case of chylothorax, an autopsy revealed a left pneumothorax, probably secondary to rupture of an emphysematous bleb. There was laceration of the apical pleura and neck tissues, probably due to stretching and rupture of a small adhesion. This apical laceration must have torn the thoracic duct in its terminal course, with leakage of chyle into the pleural cavity.—*Chylothorax, A. J. Longmore, Canad. M. A. J., April, 1952, 66: 377.—(E. A. Riley)*

Chylothorax with Embolism.—A 58-year-old man who suffered from mycosis fungoides was unsuccessfully treated with nitrogen mustard and roentgenotherapy. At the autopsy, the opening of the thoracic duct into the left subclavian vein was found to be occluded by an embolus. Chylous fluid was present in the right pleural and peritoneal cavities. The embolus originated in the antecubital veins, which were thrombosed as a result of intravenous therapy.—*Chylothorax and chyloperitoneum, report of a case occurring after embolism of left subclavian vein with thoracic duct obstruction, M. Palken & R. W. Weller, J.A.M.A. October 6, 1951, 147: 566.—(H. Abeles)*

Transthoracic Esophagoplasty.—Plastic repair or anastomosis with the stomach by direct transthoracic approach offers a cure for cicatricial stenosis of the esophagus. A girl two and a half years old swallowed a small piece of caustic alkali. Despite the usual emergency measures and a liquid diet, she was completely dysphagic three days later. The lower part of the esophagus was threadlike, although a barium suspension passed through rapidly. Attempts to dilate the passage with bougies were unsuccessful during the next three weeks. Two months after the accident a transthoracic operation under endotracheal anesthesia disclosed periesophagitis, which was removed, and an end-to-end anastomosis

was made. A number 18 sound was left in place for twelve hours, after which oral feeding was begun. Convalescence was uneventful, and two months after the operation she had gained 8 pounds.—*Oesophagoplastie transthoracique pour stenose cicatricielle de l'oesophage, A. Pettigrew & M. Samson, Laval med., March, 1952, 17: 314.*—(*A. T. Laird*)

Rib Notching.—Notching of the ribs in roentgenograms is usually due to coarctation of the aorta, but rarely is associated with the tetralogy of Fallot or with aortic valvular disease with and without hypertension. Notching has been present without any apparent cause. In coarctation of the aorta, the variable, localized erosions of the inferior border of the ribs are caused by tortuous, dilated intercostal arteries with a large blood flow. Bilateral notching usually extends from the third to the tenth ribs, inclusive; if the constriction occurs proximal to the left subclavian artery, only the right ribs may be notched. If the tortuosity of the arteries is slight, notching will be absent. In 2 cases, notching of the ribs was not due to aortic coarctation. In one of these, the notching was caused by dilated, tortuous intercostal veins carrying collateral circulation around a long-standing obstruction of the superior vena cava. This is the first reported example of rib notching caused by venous dilatation. In the second case, the cause of the notching was not definitely ascertained, but arteriography revealed a marked collateral circulation adjacent to the rib lesion. Notching of the ribs can no longer be considered pathognomonic of aortic coarctation or even of dilatation of the intercostal arteries.—*Unusual causes of rib notching, M. C. McCord & F. A. Barendam, Am. J. Roentgenol., March, 1952, 67: 405.*—(*T. H. Noehren*)

Dilatation of the Azygos Vein.—The azygos vein is visible in approximately two-thirds of routine chest roentgenograms. It can be rendered visible in more instances by using increased penetration with or without the Potter-Bucky diaphragm, and also by slight rotation toward the left or right oblique position. The azygos vein appears as a spindle-shaped shadow in the right tracheobronchial angle. In subjects without cardiovascular disease, the width of the azygos shadow (plus the wall of the trachea) is usually 5 mm. or less; in rare instances, up to 6 mm. In instances of peripheral venous stasis the azygos shadow is usually wider. Improvement or deterioration of the peripheral venous circulation, as recognized by engorgement of the neck veins and venous pressure, are well reflected in changes of the width of the azygos vein shadow in congestive heart failure, pericarditis with effusion, and constrictive pericarditis. Dilatation of the azygos vein was also regularly found in tricuspid insufficiency and in one instance of obstruction of the superior vena cava above the junction of the azygos vein; it should be expected also in tricuspic stenosis. The width of the azygos vein can be measured and recorded and lends itself to objective comparison. It appears to be a useful indicator of the functional integrity or impaired performance of the right heart; in other rarer instances, the dilated azygos vein signalizes impaired inflow due to pericardial disease, or collateral circulation in obstruction of the vena cava (Authors' summary).—*Dilatation of the azygos vein, a roentgen sign of venous engorgement, F. G. Fleischner & S. W. Udis, Am. J. Roentgenol., April, 1952, 67: 569.*—(*T. H. Noehren*)

Post-Mortem Teleroentgenograms.—Very often a routine post-mortem chest teleroentgenogram is better than the last ante-mortem film because a seriously ill patient cannot cooperate. After death there is incomplete aeration of the lungs, apparently due to the narrowing of the intercostal spaces, the high position of the diaphragm, and the contraction of the elastic lungs. Suspending the body by a halter helps to compensate for these changes. A post-mortem roentgenogram corresponds to an ante-mortem film taken during quiet breathing or expiration. The diaphragm is usually two interspaces higher, the upper lobes fairly expanded, and the lower lobes in-

completely aerated. In the post-mortem roentgenogram, the blood vessels are usually smaller and less distinct, the aorta is about one-half the living size, the heart size is variable, and the anteroposterior diameter of the chest is reduced. Routine post-mortem chest roentgenography is especially valuable when an autopsy cannot be performed, or in medicolegal cases.—*A plea for routine post-mortem chest teleroentgenograms, M. H. Poppel, A. Sheinmel, H. G. Jacobson, H. B. Copeland, Jr., & B. K. Duff, Am. J. Roentgenol., February, 1952, 67: 263.*—(*T. H. Noehren*)

ANTIMICROBIAL THERAPY

Streptomycin Therapy.—Clinical and roentgenologic changes were studied in 187 patients with pulmonary tuberculosis treated with streptomycin. The chief value of the drug lay: (*1*) in its ability to cause symptomatic improvement, and (*2*) in its effect on exudative lesions. The therapeutic effect was limited by streptomycin resistance, which appeared in most cases. The conventional roentgenologic classification of tuberculous lesions is not accurate, since exudative, noncaseous, and caseating lesions could not be distinguished. The only reliable roentgenologic evidence of caseation was the appearance of cavities within areas of pneumonic infiltration. Productive lesions were frequently accompanied by peripheral exudates, sometimes too small to be distinguished roentgenologically. A productive focus was inseparable from an initial exudative phase. Exudative lesions in areas of recent exacerbation usually resorbed with streptomycin. Small residual infiltrations almost invariably represented older foci, from which new exacerbations recurred. Streptomycin usually was useful for fibrocaseous and productive tuberculosis only in limiting the disease and causing accompanying exudative lesions to absorb. In some cases, bronchogenic spreads occurred in spite of continued treatment. Tuberculous cavities sometimes appeared during therapy, usually in caseated tuberculous pneumonia. This was not usually modified by the drug. Cavities frequently decreased in size and, when isolated, sometimes disappeared. This was due, in part, to alleviation of bronchostenosis and, in part, to reparative processes and scarring at the site of the cavity. Streptomycin alone was not definitive therapy but was a useful adjunct to accepted methods of treatment and a prophylactic measure in the surgical treatment of tuberculosis.—*Streptomycin in pulmonary tuberculosis: Clinico-roentgenological consideration, A. J. Ackerman & J. H. Moyer, Am. J. Roentgenol., March, 1952, 67: 383.*—(*T. H. Noehren*)

Intrapleural Streptomycin Therapy.—The absorption of drugs introduced into the pleural cavity is assured by the rich lymphatic connections between pleura and lung and by the persistence of the circulation in the collapsed lung. The intrapleural administration of streptomycin or of a combination of penicillin, 400,000 units, with each gram of streptomycin was well tolerated by laboratory animals and controlled an intrapleurally induced tuberculous infection in them. Eleven patients receiving pneumothorax therapy were treated intrapleurally with these antibiotics and gratifying results were noted, particularly in cases complicated by endobronchial tuberculosis and by mixed infection, as well as in cases of tuberculous empyema.—*Tratamiento del tuberculoso pulmonar con neumotórax e inyecciones intrapleurales de estreptomicina, D. J. Abelló, Rev. españ. de tuberc., October, 1951, No. 199: 599.*—(*L. Molnar*)

Tuberculous Meningitis.—Although an apparent cure without sequelae can be expected in half the cases of tuberculous meningitis treated with streptomycin, an attempt was made to increase the recovery rate by combining streptomycin and *p*-aminosalicylic acid (PAS) in the treatment of 35 cases of tuberculous meningitis. The diagnosis was confirmed by the isolation of tubercle bacilli from the cerebrospinal fluid in 30 cases. All patients were given a six-month course of intramuscular and intrathecal streptomycin simultaneously with PAS. The daily dose of intramuscular streptomycin was 1 gm.; the

daily dose of intrathecal streptomycin was 100 mg. for patients more than five years old and 50 mg. daily for those less than five. PAS was given in gradually increasing doses as tolerated until patients twelve years old or older were receiving 18 gm.; those between five and eleven years old, 9 gm.; and children under five, 4.5 gm. daily. Treatment was continued daily except Sundays. Patients were hospitalized at least a year and were not allowed out of bed until the cerebrospinal fluid findings were normal. The onset of meningeal symptoms was usually insidious, generally occurring within three months after the development of the primary pulmonary lesion. A history of tuberculous contact was present in 14 cases. The Mantoux test was positive in all instances. Of the chest roentgenograms of 33 patients, 10 were normal, 14 revealed hilar adenopathy with a parenchymal lesion, 7 showed miliary disease, and chronic pulmonary tuberculosis was present in 2 adults. Of the 35 patients treated, 28 survived and 7 died. Among the survivors, 19 were clinically well; and, of the remaining 9, 3 were well except for partial deafness.—*Tuberculous meningitis, treatment with streptomycin and para-aminosalicylic acid, S. R. Jamieson, Brit. M. J., January 12, 1952, No. 4749: 83.—(E. A. Riley)*

Streptomycin in Tuberculous Arthritis.—Ninety patients with tuberculous arthritis, having a total of 100 joints involved, were treated with streptomycin in addition to the other accepted forms of surgical and medical management. The dosages employed were from 0.5 gm. to more than 1.0 gm. daily for periods of thirty to ninety days. The series included 48 cases of tuberculosis of the spine: 13 involving the hip joint, 16 the knee, 6 the foot, 5 the sacroiliac joint, 5 the thoracic cage, and 7 other miscellaneous foci. There were 59 cases with fistula and abscess formation before the institution of streptomycin therapy. Of these, 35 healed completely with closure of the fistulas after streptomycin. Four cases required incision and drainage to accomplish healing, and 9 are still showing regression. Thus, a favorable effect was demonstrable in 48 of 59 cases. In 38 of the cases responding favorably, the daily dosage employed was from 0.5 to 1.4 gm. for thirty to eighty-nine days. The over-all results of streptomycin therapy could be properly evaluated clinically and radiologically in 84 of the 90 treated cases. In these 84 cases, the drug was judged to have exerted a markedly beneficial effect in 32, a moderately beneficial effect in 37, and a questionable action or none in 9. In 6 cases the clinical course was progressively unfavorable.—*Estreptomicina en el tratamiento de 90 casos de osteoartritis tuberculosas, A. Alonso Vial, M. Lagos, & J. Gajardo, Hoja tisiol., September, 1951, 3: 210.—(F. Pérez-Piña)*

Knee Joint Tuberculosis.—Ten cases of synovial tuberculous infection of the knee were treated with intra-articular streptomycin. Most of the patients had been treated previously in sanatoriums without much improvement. Only 3 cases were diagnosed within four months of the onset of symptoms. Streptomycin treatment was accompanied by traction and/or immobilization of the affected joint. Of the 10 cases, 4 responded well and, although the series is small and the follow-up short, it is believed that the results are encouraging enough to warrant further trial.—*Intra-articular streptomycin in tuberculosis of the knee, R. T. Ahern & G. P. Arden, Brit. M. J., March 1, 1952, No. 4756: 466.—(E. A. Riley)*

Streptomycin Reactions.—Among 65 patients with *H. influenzae* meningitis and 25 with tuberculous meningitis treated with repeated injections of intrathecal streptomycin, 14 serious reactions were observed. Five fatalities may have been due to the streptomycin reactions. The reactions consisted chiefly of shocklike states with slow, irregular respirations, inability to handle the secretions from the upper respiratory tract, convulsions, cerebellar signs, and marked fever several hours after the intrathecal injection.—*Reactions to intrathecal streptomycin, R. J. McKay, Jr., J. A. V. Davies, W. Berenberg, & H. M.*

Lowd, Jr., J.A.M.A., October 27, 1951, 147: 818.—(H. Abeles)

Anemia with Streptomycin.—A case of aplastic anemia followed prolonged administration of streptomycin; gradual recovery took place over a period of sixteen months after the discontinuation of the drug. It is suggested that prolonged courses of streptomycin, by virtue of an effect upon the bacterial flora of the human intestinal tract, may produce a folic acid deficiency with subsequent hypoplasia of the bone marrow (Authors' summary).—*Aplastic anemia complicating streptomycin treatment of pulmonary tuberculosis: Report of a case, with recovery, M. S. Sacks, G. T. Bradford, & C. L. Spurling, J.A.M.A., September 22, 1951, 147: 308.—(H. Abeles)*

Thrombocytopenia with Streptomycin.—A 32-year-old man developed tuberculous empyema in the course of pneumothorax treatment for pulmonary tuberculosis. In April, 1947, he received streptomycin, 2 gm. In October, and November, 1948, he received streptomycin, 25 gm., prior to and after a decortication and five-rib thoracoplasty. The patient developed thrombopenic purpura. On re-examination two years later, the blood platelets numbered 94,000, the bleeding time was fifteen minutes, and the Lee-White coagulation time was sixteen minutes. There was only slight clot reaction at the end of five hours. The prothrombin time was eighteen seconds. The Leeds-Rumpel phenomenon was positive.—*Thrombopenic purpura during streptomycin treatment of tuberculous empyema: Report of a case, H. Rudensky & S. Fisher, J.A.M.A., September 22, 1951, 147: 311.—(H. Abeles)*

PAS Concentration in Spinal Fluid.—The concentration of *p*-aminosalicylic acid (PAS) was determined colorimetrically in the plasma, spinal fluid, gastric juice, saliva, and urine of individuals with normal excretory function and free from neurological disorders. After the intravenous injection of 1 gm. of PAS, free PAS was practically absent from the saliva; there were traces of it during the first hour in the gastric juice. Free PAS appeared in the urine almost immediately after the injection and its concentration rose to 2 to 3 mg. per 100 ml. during the first hour; variable amounts were found even eight hours later. No appreciable amounts of PAS were found in the cerebrospinal fluid. In a second series of experiments, 1 to 2 gm. of PAS were given intravenously at hourly intervals for six hours. The concentration of PAS rose to 3 to 5 mg. per 100 ml. in the plasma after four hours, and therapeutically significant levels were noted in the cerebrospinal fluid after five to six hours. For the treatment of tuberculous meningitis, the concentration of PAS must be constantly high in the plasma if therapeutic levels are to be maintained in the cerebrospinal fluid.—*Uber die Permeabilität der Blut-Liquor-Schranke für Paraminosalizylsäure (PAS), H. Weise & A. Schrader, Deutsche med. Wchnschr., November 16, 1951, No. 46: 1462.—(L. Molnar)*

Sensitivity to PAS.—A severe case of *p*-aminosalicylic acid (PAS) sensitivity in a young adult male was by fever, sore throat, pruritis, generalized lymphadenopathy, jaundice, hepatomegaly, epigastric pain, eosinophilia, and a marked lymphocytosis. The patient was desensitized, using graduated doses of PAS by mouth, starting with 50 mg. the first day and increasing the dosage by 50 mg. each day in divided doses. If fever occurred, the dose was halved the following day and then increased as before from the reduced level. When the daily dose of PAS reached 1 gm., it was increased by 0.5 gm. each day until a therapeutic dosage of 15 gm. daily was reached. A patch test to PAS, which was positive before desensitization, became negative following desensitization.—*Acquired sensitivity to para-aminosalicylic acid, S. J. Steel, Brit. M. J., February 23, 1952, No. 4755: 415.—(E. A. Riley)*

PAS with Streptomycin.—A laboratory study was made of 221 cases receiving between 60

and 90 days of streptomycin, 1 gm. daily. Of the 154 cases in which organisms persisted after cessation of therapy, 67 per cent had organisms which were increasingly resistant to streptomycin. A second group of 58 cases received between 60 and 90 days of streptomycin, 1 gm. daily, and in addition 2 gm. of *p*-aminosalicylic acid (PAS) daily. Of the 30 cases in which organisms persisted after cessation of therapy, 64 per cent had organisms with increased streptomycin resistance. A third group of 146 cases received between 60 and 90 days of streptomycin, 1 gm. daily, and in addition 10 gm. of PAS daily. Of the 72 cases in which organisms persisted after cessation of therapy, 18 per cent had organisms with increased streptomycin resistance. It would seem that a daily dose of 10 gm. of PAS but not 2 gm., along with streptomycin, 1 gm. per day, caused a marked reduction in the number of streptomycin-resistant strains of tubercle bacilli isolated after therapy was completed (Author's summary).—*Further experience with para-aminosalicylic acid, H. M. Ross, Canad. M. A. J., April, 1952, 66: 352.—(E. A. Riley)*

Streptomycin with PAS.—The mechanisms through which streptomycin and *p*-aminosalicylic acid (PAS) inhibit *in vitro* the development of streptomycin-resistant tubercle bacilli are manifold. Schematically, they can be reduced to two principal mechanisms: (*1*) The presence of PAS, even in weak concentrations (0.025 to 1.0 mg. per cc.) diminishes the streptomycin resistance of bacilli which are slightly resistant to streptomycin (1 to 4 γ per cc.). Such bacilli exist in a bacterial population which as a whole is sensitive to 0.5 γ per cc. These bacilli are thus brought within the action of concentrations ranging from 0.5 to 1.0 γ of streptomycin per cc. (*2*) These weak concentrations of PAS also diminish the resistance of strongly resistant bacilli but they are not made amenable to the action of weak concentrations of streptomycin. High concentrations of PAS are necessary to inhibit their development and PAS acts on these bacilli as if it were present alone. Bacilli resistant to both streptomycin and PAS, which are very rare in a bacterial population not previously exposed to either of these agents, have to be attacked by the natural or immunologic defense mechanisms of the host or by a third agent such as sulfone, viomycin, neomycin, or amithiozone. There is no reason to assume that the phenomena *in vivo* at the site of the tuberculous lesion are different, but the concentrations of streptomycin and PAS utilized *in vitro* on Youmans' medium have to be multiplied approximately by 5 in order to be clinically effective *in vivo* (Authors' summary).—*Sur le mécanisme d'action de l'association P.A.S.-streptomycine (étude bactériologique in vitro), O. Kitamoto & N. Rist, Rev. de la tuberc., 1951, 15: 950.—(V. Leites)*

Antibodies for Bacterial Pneumonia.—A series of 93 patients with bacterial pneumonia was treated according to 4 therapeutic regimens. All 4 forms of therapy, i.e., aureomycin, chloramphenicol, and intramuscular and oral penicillin, were considered adequate, and there were no significant differences in the end results.—*Aureomycin, chloramphenicol, and penicillin in treatment of bacterial pneumonia, H. F. Flippin, W. V. Matteucci, N. H. Schimmel & W. P. Boger, J.A.M.A., November 3, 1951, 147: 918.—(H. Abeles)*

Aureomycin in Systemic Blastomycosis.—Of 16 cases of blastomycosis seen at a Tennessee hospital in the past ten years, 11 were systemic and 5 were cutaneous. Clinically and in the gross necropsy findings, blastomycosis may be mistaken for tuberculosis. When tubercle bacilli cannot be demonstrated in a case resembling pulmonary tuberculosis, blastomycosis should be considered. In one patient from this series, both diseases were found. Bronchogenic carcinoma has also been confused with blastomycosis. In 2 cases the clinical response to aureomycin was encouraging. *In vitro B. dermatitidis* from both cases were inhibited by aureomycin, as were 3 other strains. In one patient with systemic blastomycosis, pulmonic involvement disappeared

roentgenologically after four months of intensive aureomycin therapy. During the ensuing six months, while the patient remained on aureomycin, 3 gm. daily, 19 chest films were normal. There were no signs of the systemic disease, and there were no fungi in the sputum, bronchial washings, and gastric washings. One month after aureomycin was discontinued, bilateral pulmonic involvement recurred and fungi were readily demonstrated. Aureomycin therapy again caused rapid clearing of the lung fields; discontinuance again resulted in marked pulmonic involvement. Rapid pulmonic and systemic improvement followed the third course of therapy, indicating that *B. dermatitidis* remains sensitive to aureomycin. In the second patient, gastric specimens, sputum specimens, and bronchial washings became negative for *B. dermatitidis* on aureomycin therapy. Two subcutaneous nodules disappeared. No satisfactory follow-up was possible. Aureomycin appears able to control systemic North American blastomycosis, but it may not eradicate the fungi.—*Aureomycin in the treatment of systemic North American blastomycosis, L. V. McVay, Jr. & D. S. Carroll, Am. J. Med., March, 1952, 12: 289.—(T. H. Noehren)*

LABORATORY STUDIES

BCG in Hamsters.—An ampule of BCG chosen at random and prepared for scarification at the Pasteur Institute was inoculated subcutaneously in a hamster (*Mesocricetus auratus*). One year later the animal died and acid-fast bacilli were isolated from the spleen. These grew in culture after three weeks. Inoculation of these cultures into guinea pigs and into one rabbit did not produce lesions, but hamsters died five to eight months later from tuberculosis. BCG, 60 mg., injected subcutaneously killed hamsters within a year; 100 mg. injected intraperitoneally killed them within two and one-half to three months; and 30 to 40 mg., in three months. The lesions were similar to those found in the guinea pig inoculated with virulent tubercle bacilli. Spontaneous tuberculosis has never occurred in hamsters in this laboratory, and granulomatous lesions could never be produced by injection of cellular or bacterial debris. The unique virulence of BCG for the hamster places it in the group of Pasteur-type vaccines, such as rabies, and is not a contraindication to its use in man.—*Pouvoir pathogène du bacille B.C.G. pour le hamster, P. Hauduroy, Rev. belge path. & méd. expér., September, 1951, 21: 11.—(M. E. Sano)*

Histology of Tuberculin Reaction.—The histologic reaction to tuberculin in the skin of sensitized rabbits was compared with the reaction to a nonspecific irritant (brain phospholipid) at 4 and at 22 hours after injection. Tuberculin produced a diffuse reaction with characteristic multiple perivascular accumulations of mononuclear cells, the result both of cellular infiltration and of local proliferation. Necrosis did not occur when small doses of tuberculin were used. In both types of lesions the mononuclear component was markedly reduced by cortisone, the polymorphonuclear component being less affected. The infiltration of cells from outside appeared to be more affected than the proliferation of indigenous histiocytes. Cortisone had a more striking effect on the tuberculin lesions, only because they contained a higher proportion of mononuclear cells. There was no evidence of a specific anti-allergic activity.—*The histology of the tuberculin reaction and its modification by cortisone, P. G. H. Gell & I. T. Hinde, Brit. J. Exper. Path., 1951, 32: 516.—H. J. Henderson)*

Vitamin D_2 and Tubercle Bacilli.—According to Raab, vitamin D_2 dissolved in propylene glycol inhibited the *in vitro* growth of tubercle bacilli. If associated with vitamin A in oil, it had no inhibitory effect. Oil and propylene glycol separately were reported to have no effect. These experiments were repeated. It was found that vitamin D_2 in concentrations up to 100,000 units per cc. is not bacteriostatic. Propylene glycol, however, was found to have a marked inhibitory effect on the growth of the bacilli *in vitro*.—*Influence de la vitamine D_2 sur la croissance du bacille tuberculeux, J. Dieryck, Rev. belge path. & méd. expér., November, 1951, 21: 294.—(M. E. Sano)*

M. Tuberculosis Fractions Adsorbed on Red Cells.—Eight-week-old cultures of *Mycobacterium tuberculosis*, strain P.N., grown on Dorset and Henley's medium were washed, heat-killed, and dried. The dried bacteria were extracted sequentially with acetone, ether, and phenol before being washed with acetone and dried. This bacillary residue was extracted with methanol-phosphate-buffer solution and the sediment dialyzed against water. The solution thus obtained was evaporated to dryness; the residue, taken up in buffered saline, yielded 5 different precipitates on the addition of ethanol in increasing concentrations. By means of the agglutination and complement-fixation tests, 3 components were shown to adsorb to the surface of sheep erythrocytes. Two of the components (fractions *1-2* and fraction *4*) appeared to be predominantly polysaccharides with different chemical and serologic properties; sheep cells sensitized with them were agglutinated by the serum of persons infected with tubercle bacilli. Guinea pig complement added to the sensitized red-cell antibody system caused hemolysis. This phenomenon gave the most satisfactory basis for the titration of antibody to these fractions. Both fractions *1-2* and fraction *4* demonstrated such antibody in a significant number of sera from healthy, Mantoux-negative individuals. The third component (fraction *5*) modified sheep erythrocytes so that they are agglutinated by all human sera.—*Observations on the agglutination and haemolysis of red cells treated with extracts of Mycobacterium tuberculosis: An evaluation of methods, A. W. Pound, J. Path. & Bact., 1952, 64: 131.*—(*H. J. Henderson*)

Demonstrating Acid-Fast Bacilli in Sections.—Satisfactory demonstration of acid-fast bacilli in paraffin sections is not easy. It is more difficult with labile leprosy bacilli than with tubercle bacilli. In the usual sequence of treating the sections, one reagent alters the integrity of the waxy component on which acid-fastness depends and the next reagent removes it. The first chemical may make the waxy complex vulnerable to the subsequent reagent, which otherwise could not extract it. The difficulty can be partially overcome by methods which either protect the bacilli from extraction or restore acid-fastness after that has occurred. Tissues can be imbedded directly from water or alcohol into certain polyethylene glycols, called "carbowax." This carbowax method involves no harmful sequence of reagents either in imbedding or in dewaxing the sections and is eminently satisfactory for the demonstration of leprosy bacilli in tissues.—*Demonstration of acid-fast bacilli in tissue sections, H. H. Wade, Am. J. Path., January-February, 1952, 28: 157.*—(*J. S. Woolley*)

Bacteriology of Embalmed Tissue.—Viable tubercle bacilli were recovered from tissues removed from 22 embalmed bodies examined three to sixty hours after the embalming process. Most of the lesions from which these organisms were recovered were well vascularized ones into which the embalming fluid should be expected to penetrate. It is suggested that such material may be the source of tuberculosis for pathologists and others who have contact with cadavers.—*The isolation of pathogens from embalmed tissues., L. A. Weed & A. H. Baggenstoss, Proc. Staff Meet., Mayo Clin., March 26, 1952, 25: 124.*—(*E. A. Riley*)

Hyaluronidase and Pleural Absorption.—Phenolsulfonphthalein (6 mg.), alone or in combination with 25 units of hyaluronidase, was introduced into the pleural cavity of rabbits; the elimination of the dye was determined colorimetrically. The administration of hyaluronidase accelerated markedly the excretion of the phenolsulfonphthalein, increasing the total amount of the excretion by 15 per cent as compared with the controls.—*Influenza del fattore diffusore sull'assorbimento pleurico, R. Mannino, Arch. "E. Maragliano" pat. e clin., September-October, 1951, 6: 857.*—(*L. Molnar*)

PUBLIC HEALT HAND EPIDEMIOLOGY

Case Finding.—A tuberculosis case-finding program has been set up by the Veterans Administration. It includes an initial 4- by 5-inch

roentgenogram for each inpatient and outpatient, with another film every twelve months. Tuberculin tests and roentgenograms are also made of each new employee. Those with negative tuberculin tests have Mantoux tests every six months and chest films every twelve months if they are not regularly exposed to tuberculosis. In the group exposed to tuberculosis, tuberculin testing is repeated every three months. If the tuberculin reaction becomes positive, films are repeated every three months for eighteen months, and then every six months. The following statistics have resulted from this study in an eighteen-month period from 1949 through 1951. Over a million roentgenograms were taken. Six-thousand forty-five persons (0.6 per cent) were discovered to have active pulmonary tuberculosis; 17,450 had inactive tuberculosis, and 7.729 individuals were classified as suspected cases; 0.5 per cent of the outpatients, 0.8 per cent of the inpatients, and 0.1 per cent of the employees had active disease. In these groups, 29 per cent, 23 per cent, and 65 per cent, respectively, had minimal disease. In the patient groups, the prevalence rates of both active and inactive tuberculosis were appreciably higher for veterans fifty years of age and over. The prevalence of active tuberculosis in this employee group was similar to the rate usually reported for adults examined in community-wide surveys. The Veterans Administration believes this is an effective program and that all persons seeking medical care should have routine chest films since the prevalence in this group is significantly higher than in the general population.—*Tuberculosis case-finding survey program of the Veterans Administration, L. Schneider & M. Robins, Pub. Health Rep., February, 1952, 67: 189.—(S. Hadley)*

Tuberculin Allergy and BCG.—In 1947, 80 per cent of the children in Muscogee County, Georgia, were tuberculin tested. Only 8 per cent of the white children and 20 per cent of the Negroes were sensitive to 0.0001 mg. of PPD. Thirty-seven per cent of both groups reacted to 0.002 mg. of PPD. Eliminating these reactors, 4,839 children were vaccinated with BCG. Six months later the group again received tuberculin tests, and all nonreactors (8 per cent) were revaccinated. In 1950, tuberculin tests were repeated as part of another program. At this time, the World Health Organization recommendation of the use of 5 tuberculin units or 0.0001 mg. of PPD only was employed. Only 41 per cent of the white children showed reactions of 5 mm. or more induration at the six-month testing, and this had fallen to 23 per cent by the end of five years. In addition, 7 per cent of the unvaccinated controls had attained that degree of allergy by three years. This small residual effect of BCG vaccination after three years is of considerable interest and points out the need for constant evaluation of the effectiveness of vaccination in relation to the allergy induced.—*Field studies on immunization against tuberculosis: I. Tuberculin allergy following BCG vaccination of school children in Muscogee County, Georgia, L. Shaw, Pub. Health Rep., November 2, 1951, 66: 1415.—(S. Hadley)*

BCG.—An extensive BCG campaign was carried out from 1948 to 1950 in the town of Montreuil near Paris. Thirty-one and six-hundredths per cent of the population up to the age of 19 years received BCG. Vaccinations were done in 20.2 per cent in the age group 0 to 4 years; in 48.5 per cent between the ages of 5 and 14; and in 6 per cent between the ages of 15 and 19. During the period 1948 to 1950 there was a marked regression in the incidence of primary tuberculosis. In 1948 active primary tuberculosis represented 13.1 per cent of all admissions to the tuberculosis dispensary in the age group 0 to 4; this incidence dropped to 8.9 per cent in 1950. In the age group 5 to 14 the incidence was 9.71 per cent in 1948 and 2.28 per cent in 1950. In the group 15 to 19 the incidence dropped from 1.1 per cent to 0.6 per cent. The regression of primary tuberculosis was almost proportional to the number of vaccinations in each age group. The same statistical studies were carried out in a similar community near Paris where no BCG had been administered. This "control town" was comparable to Montreuil regarding

socio-economic conditions and general incidence of tuberculosis. In the age group 0 to 14 the incidence of primary tuberculosis in the dispensary was 6.7 per cent in Montreuil as compared to 7.3 per cent in the control town in 1948. In 1950 the incidence in Montreuil dropped to 3.31 per cent, while the control town showed a rise to 14.9 per cent. The incidence of all forms of tuberculosis, except primary tuberculosis, was compared in the 2 towns: In Montreuil the age group 0 to 19 showed a rise from 1.13 per cent in 1948 to 2.76 per cent in 1949; in the control town the figures were 0.75 per cent and 0.87 per cent in the same age group. Between 1949 and 1950 the Montreuil figures showed a decline from 2.76 per cent to 0.97 per cent; there was no corresponding decline in the control town but a rise from 0.87 to 2.01 per cent. After the age of twenty the incidence in Montreuil was 4.86 per cent in 1948 and 6.72 in 1950. The corresponding percentages in the control town were 6.05 and 6.59. The differences in tuberculosis morbidity, except primary tuberculosis, before the age of twenty in both towns and the parallel progression after the age of twenty is explained by the fact that BCG vaccinations in Montreuil were not extended beyond the twentieth year. These figures also demonstrate a definite effect of BCG, not only on primary tuberculosis, but also on forms belonging to the second and tertiary-stage.—*L'efficacite du B.C.G. sur les tuberculoses primaires et post-primaires de l'enfant et de l'adolescent: l'expérience de Montreuil, M. Fourestier, G. Baissette, L. Bergeron, & A. Gonzalès, Rev. de la tuberc., 1951, 15: 1084.*—(*V. Leites*)

BCG in Social Workers.—The incidence of primary tuberculosis was determined before and after introduction of BCG in a school for tuberculosis social workers and nurses. In the period from 1935 to 1942, 88 of 434 students had a negative tuberculin reaction. Among these, 23 showed evidence of primary tuberculosis as follows: 2 fatal cases of miliary tuberculosis, one fatal case of tuberculous meningitis, 2 cases of pulmonary tuberculosis, 5 cases of pleurisy which healed subsequently, 8 cases of erythema nodosum without serious consequences, one case of pelvic tuberculosis 4 cases of primary tuberculosis with pulmonary foci and marked adenopathy. In 10 additional students the conversion of the tuberculin reaction from negative to positive was associated with fever and fatigue of several days' duration. From 1943 to 1951, 155 tuberculin-negative students (of a total of 477 students) received BCG by the scarification method. The only local reaction was one case of purulent adenopathy, which showed subsequent healing. There was one pleurisy of short duration in 1943; there was no other manifestation of tuberculosis during the entire observation period.—*Vaccination par le B.C.G. dans une école d'assistantes sociales, Courcoux, Duret, Choubrac, & Le Menager, Rev. de la tuberc., 1951, 15: 1083.*—(*V. Leites*)

Pleural Calcification from Dusts.—Deposits of calcium on the pleural surfaces are an occasional sequela of pleurisy, empyema, and traumatic hemothorax. In pneumoconioses, such as silicosis and asbestosis, pleural involvement is the rule; associated pleural calcifications are uncommon. Roentgenographic surveys of workers in dusty trades have revealed that exposure to certain dusts is associated with a much higher incidence of pleural calcifications than is expected in routine chest surveys. The incidence of pleural calcification among workers in most dusty trades ranges from zero to 0.3 per cent. Workers exposed to the dust involved in making bakelite insulators, to calcimine, mica, and tremolite talc have the highest incidence; the talc group reaching an incidence of 6.3 per cent. The calcific plaques vary in size from a single linear deposit a few centimeters long in the region of the diaphragm to massive deposits, bizarre in shape, extending over a large part of both lung fields. Among mica workers, many men have excessive calcification of the hilar lymph nodes. These changes may be due to pleural irritation produced by the dusts whose content of calcium and magnesium may also stimulate calcium deposition. —*Pleural calcification resulting from exposure to certain dusts, A. R. Smith, Am. J. Roentgenol., March, 1952, 67: 375.*—(*T. H. Noehren*)

THE AMERICAN REVIEW OF TUBERCULOSIS

ABSTRACTS

Edited by LAWRENCE B. HOBSON

VOLUME 66 OCTOBER, 1952 ABST. NO. 4

CLINICAL STUDIES, TUBERCULOSIS

Fresh Air Treatment.—The fresh air treatment of pulmonary tuberculosis, still widely prevalent in French sanatoriums, was submitted to a critical re-evaluation in the French Student Sanatorium. Starting in 1950, the patients chose whether they would take their prescribed rest hours in their rooms or on the cure-balconies and whether to leave their windows open or closed. The vast majority preferred to take bed rest in their rooms. Prior to 1950, continuous exposure to fresh air had been the routine. The status of patients discharged in 1949 (287 cases) and in 1951 (306 cases) was compared: improved, 88 per cent in 1949 and 86.2 per cent in 1951; stationary, 5 per cent in 1949 and 12 per cent in 1951; worse, 4.6 per cent in 1949 and 1.2 per cent in 1951; dead, 2. 4 per cent in 1949 and 0.6 per cent in 1951. Far from having any specific therapeutic properties in pulmonary tuberculosis, open-air treatment may even have harmful effects. From 1934 to 1949, the number of pleural effusions in pneumothorax patients was twice as high in the cold season as in the warm season.—*Aeration continue et cure sanatoriale, R. Cohen, Rev. de la tuberc., 1951, 16: 248.—(V. Leites)*

Tuberculosis and Pregnancy.—In an assessment of the effect of pulmonary tuberculosis upon pregnancy, a total of 54 completed pregnancies among 47 patients with pulmonary tuberculosis were studied. Of the 13 patients with active disease, 7 deteriorated, 4 showed no change, and 2 have shown roentgenographic improvement. Among the 34 patients with inactive disease, 7 deteriorated, 21 showed no change, and 6 showed roentgenographic improvement. Among 18 patients whose pregnancies were terminated, 6 had active disease and 12 were inactive. Among the patients with active disease, 5 deteriorated following abortion and one remained stationary. Among the inactive cases, 3 deteriorated following abortion, in 6 there was no change, and in 3 improvement was noted. From this evidence therapeutic abortion seemed to have no effect upon the course of the disease and there was little evidence that full-term pregnancy had any effect upon the pulmonary tuberculosis.—*Pulmonary tuberculosis and pregnancy, J. R. Edge, Brit. M. J., April 19, 1952, No. 4763: 845.—(E. A. Riley)*

Abdominal Tuberculosis.—Among 4 cases of lymphohematogenous tuberculosis, postmortem examination in 3 instances revealed tuberculosis of abdominal lymph nodes, liver, and spleen, and in the fourth patient tuberculosis of the spleen was found on splenectomy. Two patients also had miliary tuberculosis of the bone marrow. All 4 patients showed an abnormal blood picture. One had a leukamoid reaction; another appeared to suffer from polycythemia; a third patient, whose illness was rapidly fatal, had a profound neutropenia and anemia. The fourth patient initially had a thrombocytopenia. The diagnosis of this form of tuberculosis may be difficult and, in certain instances, may be distinguished from other diseases producing a similar clinical appearance only after an exploratory laparotomy. The hematologic disorders are thought to be associated with splenic rather than bone marrow involvement. Streptomycin appears to be the treatment of choice in hepato-splenic tuberculosis.—*Atypical abdominal tuberculosis with haematological manifestations, J. Friend & A. C. Thackray, Brit. M. J., March 15, 1952, No. 4758: 574.—(E. A. Riley)*

Erythema Nodosum.—Three cases of erythema nodosum occurred simultaneously in one family. The skin lesions appeared six to eight weeks following exposure to an infectious case of pulmonary tuberculosis and in 2 young children was accompanied by the development of a positive tuberculin skin reaction indicating a recent primary tuberculous infection.—*Familial erythema nodosum, J. Fry, Brit. M. J., March 8, 1952, No. 4757: 529.—(E. A. Riley)*

Tubercle Bacilli in Hematomata.—In 2 young adults, tubercle bacilli were found in hematomata of soft tissues after trauma, although no bone or joint lesions were present. Trauma, by causing hematomata, may have provided a site for localization and growth of tubercle bacilli from the blood stream.—*Tubercle bacilli in haematomata, J. G. Goudie, J. Path. & Bact., April, 1952, 64: 417.—(H. J. Henderson)*

Bone Marrow Cultures.—Bone marrow was aspirated from the sternum or iliac crest of 65 tuberculous children aged fourteen years or less. Inoculation of 0.1 to 0.2 cc. was made into Löwenstein and Petragnani media. Smears were also made. Positive cultures, confirmed by guinea pig inoculation, were obtained in 16 cases; the human organism was found in 12 cases, and the bovine in 4.—*Bone-marrow cultures of Koch's bacillus, C. Choremis & S. Pantazis, Lancet, April 12, 1952, 1: 478.—(A. G. Cohen)*

Vitamins in Pulmonary Tuberculosis.—The urinary output of thiamine, riboflavin, and niacin was studied in 37 cases of pulmonary tuberculosis. The levels were generally lower than in normal individuals; the diminution was proportional to extent and gravity of the disease. Streptomycin had no effect on the excretion of thiamine and niacin but reduced further the output of riboflavin.—*Le taux des vitamines B_1, B_2, et PP en streptomycino-therapie dans les tuberculoses pulmonaires, R. Sartory, I. Meyer, M. F. Foussereau, & I. Touiller, Rev. de la tuberc., 1951, 16: 207.—(V. Leites)*

Long-Term Results of Pneumothorax.—The results in 323 cases of re-expanded pneumothorax maintained for two to seven years between 1935 and 1950 are evaluated. Pneumothoraces of less than one year's duration were excluded from the study. In 27.4 per cent of the cases, pneumothorax was ineffective either because of relapse *in situ* (11.7 per cent) or incomplete result (13 per cent). Serious complications of pneumothorax necessitating its interruption were encountered in 7.12 per cent; 12 per cent of the patients developed contralateral disease. Considerable functional impairment occurred in 12 per cent; complete loss of function of the collapsed lung in 8.97 per cent. Thus, less than 50 per cent of cases had satisfactory long-term results. This figure includes all cases. Considering the type of lesion before collapse therapy, 78.3 per cent of noncavitary lesions were believed cured, as compared with 50 per cent among the cavitary lesions. Primary resection should be considered for those cases unlikely to do well with pneumothorax.—*Resultats éloignés du pneumothorax artificiel, P. Laval, Rev. de la tuberc., 1951, 16: 118.—(V. Leites)*

Pneumoperitoneum Results.—A series of 190 cases of pulmonary tuberculosis were treated between the years 1944 and 1949 with artificial pneumoperitoneum; 53 per cent of the patients had moderately advanced disease; 45 per cent had far advanced disease. In 81 per cent of the patients the disease was bilateral with cavitation. Other concomitant forms of therapy included technically successful pneumothorax in 31 cases, streptomycin in 87 (46 per cent), phrenic crush in 100 (52 per cent), and surgery in 25 (13 per cent). Of these surgical procedures, 22 were thoracoplasties. There were 19 deaths. Good results were obtained in 70 cases (37 per cent); 39 per cent showed improvement. The majority of patients had elevation of the diaphragm equivalent to one posterior interspace. A number of patients showed no significant elevation. Cavity closure was best obtained with cavities located at the base or in the apex of the lower lobe. End results were much

better with phrenic crush than without, but this procedure was usually withheld in cases in which other surgery was delayed because pulmonary secretions could not be expelled. Pneumoperitoneum was terminated in 31 cases, in 11 with medical approval and in 12 because of side reactions. In the remaining 8, it was discontinued for miscellaneous reasons. No serious complications were seen. One case of mediastinal emphysema was noted. It is believed that to be effective the procedure of pneumoperitoneum should be continued from two to four years.—*Pneumoperitoneum in the treatment of pulmonary tuberculosis, J. C. C. Yeh, Canad. M. A. J., June, 1952, 66: 553.*—(*E. A. Riley*)

Pneumothorax Results.—The late results in a series of 120 patients treated for pulmonary tuberculosis with artificial pneumothorax without streptomycin were studied two to seven years following discontinuation of therapy. Six patients had minimal disease, 110 moderately advanced, and 4 far advanced tuberculosis. On the average, pneumothorax was maintained for 30 months in cases of minimal disease, 63 months in moderately advanced disease, and 65 months in the far advanced cases. Of the 120 patients, 106 (88 per cent) are well and working with inactive disease. Among these patients, 56 had definite roentgenographic signs of cavity at the time pneumothorax was induced. These favorable results depend upon a few basic principles: (*1*) early pneumonolysis or prompt discontinuation of pneumothorax if adhesions cannot be severed, (*2*) maintaining a selective collapse, and (*3*) maintainance of pneumothorax for sufficient length of time.—*The late results of pneumothorax therapy, J. H. Rubin & H. F. Burke, Canad. M. A. J., May, 1952, 66: 447.*—(*E. A. Riley*)

Artificial Pneumothorax.—A series of 50 patients with pulmonary tuberculosis received 54 artificial pneumothoraces under the supervision of the authors. The pneumothoraces were begun during 1935 to 1944. There were 21 male and 29 female patients. The ages ranged from 13 to 50 years, mostly 20 to 30. At the time of induction, the patients had few constitutional symptoms, but cough and expectoration were common. The disease was unilateral in 24 cases; it involved one zone in 11, two zones in 30, and three zones in 13. A cavity was present in 36 cases. Severe toxemia, pneumonic disease, predominant fibrosis or atelectasis, and very large cavities were considered contraindications to pneumothorax. There was no preponderance of fluid formation among those who had had relatively little bed rest prior to induction. Adhesions were noted in 45 cases, often in those who previously had had pain. Thoracoplasty was done within two months. Division of adhesions often required more than one operation. Following pneumonolysis, atelectasis appeared in 15 cases, was total in 12 and lobar in 3. Re-aeration was complete in all but 2 cases. A trace of fluid appeared after pneumonolysis in 6, and a moderate effusion in 8, cases. In 5, the fluid became purulent. In one case, a hemothorax with bronchopleural fistula eventually became empyemic. The complications were: (*1*) atelectasis in 7 patients who did not receive thoracoscopy; this was total in 3, lobar in 3, and segmental in 2. Re-aeration occurred in 5; no untoward effects appeared in the other 2 patients. (*2*) Small noncumulative effusions in 15; no special therapy was required. (*3*) Cumulative effusions above the diaphragm in 15; in 8 this occurred after pneumonolysis. In 13, the onset was insidious. In 6, there were no ill effects. Obliteration occurred in one and empyema in 8, of whom 4 died. (*4*) Obliterative changes leading to premature expansion in 13 cases. (*5*) Failure of the lung to re-expand in 7, especially after fluid formation, occasionally after atelectasis. (*6*) Rupture of adhesions in one case, leading to empyema. There were no instances of air embolism. Of 37 cases with cavity, initial closure was accomplished in 31. The other 6 cases eventually required other forms of therapy. The average duration of institutional therapy after induction was 7.6 months. In 5 cases, the pneumothorax expanded prematurely before three years; only one of these patients is well. An attempt was made to maintain the pneumothorax for three to five years; this was accomplished in

45 cases, of whom all but 3 are well. The pneumothorax was abandoned intentionally in 26 cases after an average of 5.3 years; 24 are well. It was abandoned unintentionally after three years (average 3.25) in 7 cases; 6 are well. Of the entire series of 50 cases, 46 returned to work. No attempt was made to compare these results with those of other forms of therapy. The authors favor pneumothorax in selected cases, provided that adhesions are cut promptly and the collapse is maintained only if complete.—*Artificial pneumothorax, F. Scadding, H. Nicholson, & C. Hoyle, Quart. J. Med., October, 1951, 20: 313.—(A. G. Cohen)*

Surgical Closure of Draining Bronchi.—Cavity closure was achieved in 16 cases by the ligation or section of bronchi draining tuberculous cavities. Possible lymphatic spread of the disease from the opening of the peribronchial lymphatics was avoided by careful technique and by the local use of antibiotics. The first group of 4 patients had long-standing cavitation, complicated by empyema from cavity perforation; for them, no other surgical intervention was indicated because of their poor general condition and extensive disease. In 3 of these cases the main bronchus and in one the upper lobe bronchus were ligated, and the first five ribs were resected. In 3 of them a lower-stage Schede thoracoplasty was performed later. One patient died from hemorrhage after the thoracoplasty. The sutures were eliminated in 3 cases so that a sinus tract into the operative wound resulted; this closed in two to three months. In a second group of 6 patients, the operation was performed for solitary or multiple cavitation in the upper lobes; in them, contralateral disease or advanced age prevented more extensive surgical treatment. In 3 the upper lobe bronchus and in the remaining 3 one or more segmental bronchi were severed and the bronchial stumps sutured. In 4 cases the first three or four ribs were resected as well. The postoperative course was uneventful with the exception of one case of nontuberculous empyema easily controlled by thoracotomy. The third group of 6 cases included patients with isolated cavities in the upper lobes; they had a better prognosis than those in the previous groups but had failed to respond to other forms of therapy. Upper lobe bronchus section was performed in one case, and one or more segmental bronchi were closed in the remaining 5 cases. No thoracoplasty was done in this group. The cavity failed to close in one case when the bronchus of the apical segment was severed; a subsequent lobectomy showed that the cavity was also drained by the bronchus of the dorsal segment. The postoperative course was characterized in all cases by fever for two to three weeks. The fever and the associated constitutional symptoms were more accentuated in the first group, in which the disease was more entensive and severe. The quantity of sputum diminished rapidly in all cases, and no tubercle bacilli were found in it during three to six months. Roentgenograms showed that the cavities gradually disappeared in two to six weeks; the segment or lobe in which the bronchus was closed became more opaque and signs of retraction appeared. The lung of the patient who died following a Schede thoracoplasty five months after the closure of the bronchus showed a marked increase of the connective tissue with scant alveolar structure and small isolated caseous foci in the segment. The lack of postoperative progression of the tuberculous process may be explained by the complete rest of the diseased lobe or segment. Reduction of the oxygen content of the atelectatic lobe or segment provides a poor medium for the multiplication of the bacilli. During the operation it may be difficult to locate the draining bronchi and to avoid injuring blood vessels. If these early results are confirmed by a longer follow-up, the surgical closure of bronchi draining tuberculous cavities may prove to be valuable for patients who cannot benefit from more extensive surgical treatment.—*Der Verschluss des Dränagebronchus als selbstständiges oder ergänzendes Behandlungsverfahren bei der kavernösen Lungentuberkulose, R. Nissen & A. Lezius, Deutsche med. Wchnschr., March 28, 1952, No. 13: 385.—(L. Molnar)*

Thoracoplasty and Cervical Rib.—An incomplete cervical rib was resected in a young man in the course of a thoracoplasty on the left side. The importance of an accurate study of the preoperative roentgenogram is important because an unsuspected cervical rib may not be apparent during the intervention, and the failure to remove it leaves the extrapleural apicolysis incomplete.—*Costillas cervicales y toracoplastia, J. L. Lopez Sendon, Rev. espaň. de tuberc., January, 1952, No. 202: 1.*—(*L. Molnar*)

Cavernostomy.—Since January, 1949, 13 cases have been treated by Maurer's method for draining pulmonary tuberculous cavities externally. The cavities drained were all at least 4 cm. in diameter and close to the anterior chest wall; most were limited to the apex. Besides this principal cavity, all of the patients had other active lesions in the same or opposite lung, contraindicating other surgical procedures. It was hoped that antibiotics would prevent serious reactivations. The patients selected had not improved enough previously with antibiotics to permit less hazardous procedures. The cavities to be drained were walled off from the main pleural cavity by firm adhesions; otherwise, the adhesions were produced artificially before drainage was attempted. Drainage was instituted under radioscopic and tomographic control with a Saugman needle and a cannula 4 mm. in diameter and 12 cm. in length. This was replaced twenty-four to thirty-six hours later by a rubber drainage tube 6 mm. in diameter. Cannulas and drainage tubes of progressively increasing diameters were inserted until finally the drainage aperture was 18 mm. in diameter. Later, gauze wicks were employed. There were three complications to fear: (*1*) increased weakness with prolonged fever, (*2*) a congestive local reaction visible roentgenographically and shown clinically by increased expectoration, and (*3*) the development of new lesions. These changes occurred even in the patients treated from the beginning with streptomycin. The development of new lesions remote from the cavity, however, seems to have been prevented by early treatment with streptomycin and *p*-aminosalicylic acid. Local injections into the cavity were useless. After the dangerous period of dilatation of the opening had passed, the temperature usually became normal, the patient gained weight, and tubercle bacilli became fewer or disappeared. There was one immediate fatality. In 12 cases there were local relapses, causing drainage to be abandoned. In 5 cases, thoracoplasty was made possible; this resulted in cure in one case, some local improvement in one, and failure in 3. A successful pneumonectomy was possible in one case. Cavernostomy must be considered a form of treatment to be employed only in exceptional cases.—*Contribution à l'étude de la cavernostomie (drainage de Maurer) dans le traitement actuel de la tuberculose pulmonaire, A. Petit, Acta tuberc. belg., April, 1952, 43: 77.*—(*A. T. Laird*)

CLINICAL STUDIES, NONTUBERCULOUS DISEASES

Pulmonary Eosinophilia.—Pulmonary eosinophilia is a condition in which pulmonary infiltration is accompanied by blood eosinophilia, but in which resolving pneumonia, hydatid disease, Hodgkin's disease, and sarcoidosis can be excluded. This definition is not absolute but includes: (*1*) simple pulmonary eosinophilia or Löffler's syndrome of transient infiltrations; (*2*) prolonged pulmonary eosinophilia with prolonged or recurrent infiltrations without asthma; (*3*) pulmonary eosinophilia with asthma; (*4*) tropical pulmonary eosinophilia, usually with asthmatic symptoms; and (*5*) polyarteritis nodosa. In simple pulmonary eosinophilia (Löffler's syndrome), the symptoms are mild or entirely absent. Physical signs are slight or absent. Abnormal shadows are seen radiographically, but these are transient and disappear in six to twelve days. The eosinophilia ranges from 3.5 to 60 per cent. Etiologically, a number of factors have been implicated. Of these, infestation with *Ascaris lumbricoides* is by far the commonest. Other worms also have been incriminated in some cases. Prolonged pulmonary eosinophilia includes cases in which infiltrations persist more than one month; 17 cases have been reported. Many patients have

persistent fever. Most have a nonproductive cough. Radiographic changes vary from indefinite, localized mottling to relatively homogeneous shadows occupying most of the lung fields. The changes are almost always more pronounced in the upper zones and are often bilateral at some stage. The eosinophilia varies from 10 to 72 per cent. The illness lasts two to six months, but is usually followed by complete recovery. In all but 4 of the reported cases, there was evidence of either parasitic infestation or allergic diathesis. In tropical eosinophilia, there is an initial stage of malaise, fever, coryza, and dry cough lasting from a week to a month. The bronchitic aspect then becomes the most prominent feature and may continue for months to years. This is followed by an asthmatic phase. In approximately one-half of the cases, the radiograph will show a diffuse mottling throughout both lung fields. The total leukocyte count ranges from 15,000 to 50,000, with an eosinophilia of 20 to 90 per cent. The response to arsenical therapy is dramatic. Infestation of the respiratory tract by mites has been implicated. In pulmonary eosinophilia with asthma, the occurrence of pulmonary infiltrations is only an incident in chronic bronchial asthma. Approximately three-fourths of the patients have fever, and most complain of cough during the attack. In most cases, the infiltrations are bilateral. The total leukocyte count is increased, and high eosinophile counts are common. Of 67 cases, 29 have had lesions in other organs, including sinusitis in 21, pleural effusion in 9, purpura in 6, paralysis in 5, adhesive pericarditis, polyarteritis, and ascites in 4 each, pericardial effusion, urticaria, and ulcerative colitis in 2 each, and encephalitis and enlarged liver in one each. Cases of proved polyarteritis nodosa are not included in this group. The prognosis varies; 9 patients have died. The asthma is often chronic or recurrent. In polyarteritis nodosa, lung changes are frequent at necropsy but there are only a few cases in which infiltrations are shown radiographically, almost always bilaterally. The syndrome of pulmonary eosinophilia is regarded as representing a peculiar reaction of the body to various stimuli. This ranges in severity from mild to prolonged severe cases It may or may not include bronchial involvement, which gives an asthmatic picture. If, in addition, there are gross lesions of the blood vessels, there will probably be lesions of other organs and the condition may present the picture of polyarteritis nodosa.—*Pulmonary eosinophilia, J. W. Crofton, J. L. Livingstone, N. C. Oswald, & A. T. M. Roberts, Thorax, March, 1952, 7: 1.*—(*A. G. Cohen*)

Löffler's Syndrome with Tuberculosis.—Eleven cases of Löffler's syndrome occurred within a nine-day period in a hospital for pulmonary tuberculosis. The 5 women and 6 men had various stages of tuberculosis. There was fever, usually moderate, lasting one to fourteen days, four or five days in the majority of cases. Of the 11 patients, 7 had vague gastrointestinal symptoms. All of the patients had some shortness of breath and signs of bronchitis. Roentgenograms showed nonhomogeneous, ill-defined densities in previously uninvolved parts of the lungs, mostly at the bases. The infiltrations were unilateral in the majority of cases. Their disappearance was as sudden as their development. Eosinophilia was present in all cases and was mostly of moderate degree, but it reached 14, 19, and 39 per cent in some cases. The eosinophilia persisted after resolution of the pulmonary infiltrations. Five months after this episode, the presence of ascarides was demonstrated in 6 of the 11 patients. There was no repercussion on the clinical or roentgenographic aspect or the tuberculous process.—*Images pulmonaires labiles à caractère épidemique en milieu sanatorial, G. Pesle, M. Bru, M. Labeguerie, I. Le Nouène, A. Sibot, & J. Zmajevitch, Rev. de la tuberc., 1951, 16: 97.*—(*V. Leites*)

Bronchial Asthma.—An attempt was made to correlate the roentgenographic findings with the clinical features in 200 cases of asthma, 100 children and 100 adults. The series consisted of patients with typical asthma, seen as outpatients only. Sinus radiographs showed changes in more than one-half of the cases, there being a higher proportion with marked abnormality in the children than in the adults.

The chest roentgenograms, disregarding minor abnormalities, were distributed into 5 groups: normal, emphysema, emphysema and increased hilar shadows, increased hilar shadows, and other important abnormalities. The last group included cases of pulmonary tuberculosis, segmental collapse, and recurrent transient shadows believed to be due to localized areas of infection. In attempting to distinguish between irreversible emphysema and pulmonary distension due to the bronchiolar obstruction of asthma, roentgenograms taken in full inspiration and full expiration were compared with one taken in expiration with a normal control. Emphysema was the commonest complication, occurring in 28 children and 46 adults. The evidence suggested that both chronicity and infection are important factors in its development. Enlarged hilar shadows were present in a higher proportion of the infective than of the noninfective cases. Segmental collapse, with subsequent satisfactory re-expansion, was present in 4 per cent and was seen in both infective and noninfective types. Active pulmonary tuberculosis was found in 1.5 per cent. The chest radiograph in uncomplicated asthma is normal, but a great deal of help can be obtained from radiography in the diagnosis of complications, in the elucidation of the etiology, and in the discovery of coincidental conditions (Author's summary).—*X-ray appearance in asthma, a study of 200 cases, H. Royle, Brit. M. J., March 15, 1952, No. 4758: 572.—(E. A. Riley)*

Bornholm Disease.—Epidemic pleurodynia occurred in 17 male and 7 female patients during the summer of 1951. The onset was usually sudden, with pleuritic pain in the upper abdomen or lower thorax as the outstanding feature. In 5 cases a transient pleural friction rub was noted four to ten days after the onset. In 5 families, 2 members were affected. Contact could also be traced between another pair and probably between 2 others. The incubation period was possibly between four and six days.—*Outbreak of Bornholm disease in West Fife practice, W. W. W. McNeish & C. Stewart, Brit. M. J., April 5, 1952, No. 4761: 744.—(E. A. Riley)*

Visceral Herpes Simplex in Infants.—The virus of herpes simplex can cause a fatal disease in the newborn in the absence of significant cutaneous lesions and can invade the blood stream during herpetic gingivostomatitis in older infants, giving rise to specific hepatitis. Pathologic evidence and clinical data, confirmed in one case by isolation of the virus from the liver, demonstrated the development of herpes virus septicemia with metastatic lesions in 5 newborn infants. In 3 older infants, the specific hepatitis was studied. The clinical features of the disease in the newborn were remarkably similar. The systemic reaction appeared on the fifth to seventh days of life, with fever or hypothermia, increasing icterus, respiratory distress, vomiting, dyspnea, cyanosis, and the rapid development of circulatory collapse. Enlargement of the liver and sometimes of the spleen completed the similarity of this picture to that of bacterial sepsis. The organs involved, approximately in the order of frequency, were liver, adrenal, spleen, esophagus, lung, kidney, marrow, lymph nodes, stomach, brain, skin, conjunctiva, and tongue. Lung lesions were present in 4 of the 5 infants and resembled those in the other organs, with extensive necrosis, involving areas of many lobules. Inclusions were abundant in the vicinity of the necrotic lesions, chiefly in the stroma cells of the alveolar septa, the peribronchial connective tissue, the adventitia, or occasionally the intima of small blood vessels, lymphatics, fibroblasts of the pleura and, less commonly, in the epithelial cells lining the alveoli. Of the 3 older infants with specific hepatitis, 2 had pulmonary lesions, one having small foci of pulmonary hemorrhage and the other an intense bronchitis and peribronchitis compatible with pertussis. The findings constitute evidence for the occurrence of herpes viremia in humans, to which premature infants are especially susceptible. The pathogenesis appears comparable in every detail with experimental infections in chick embryos and young animals. The mode of in-

fection is variable. Exposure may occur during passage through a birth canal infected with herpes virus. The portal of entry may be the conjunctiva, oral mucosa, or skin. In one instance the possibility of placental transmission existed.—*Herpes simplex virus as the cause of fulminating visceral disease and hepatitis in infancy, W. W. Zuelzer & C. S. Stulberg, A. M. A. Am. J. Dis. Child., April, 1952, 83: 421.* —(*M. J. Small*)

Sarcoidosis and Polyarthritis.—A 24-year-old woman had generalized sarcoidosis and a rheumatoid type of arthritis. Sarcoidosis was manifested by typical skin lesions, characteristic histologic changes, pulmonary infiltration and hilar adenopathy, small cystic areas in some of the bones of the feet, and elevation of the serum proteins with reversal of the normal albumin-globulin ratio. There were subjective and objective changes in the joints, including swelling, tenderness, and limitation of motion. Roentgenograms of the joints showed narrowing of the joint space and some roughening of the articular surfaces. The bones adjacent to the involved joints did not show the cystic changes of sarcoidosis, and involvement of the bone marrow by sarcoidosis was not demonstrated by aspiration biopsy of the sternum. A juxta-articular nodule was "rheumatic" histologically. The patient at one time had a slight fever, an elevated sedimentation rate, and hypochromic anemia. Arthritis might arise in conjunction with sarcoidosis by five different mechanisms: (*1*) as an extension to the joint from sarcoid involvement of the bones; (*2*) as a primary involvement of the synovia by a sarcoid process; (*3*) as part of the general toxemia of the sarcoidosis; (*4*) as a separate condition but caused by the same etiologic agent as the sarcoid; or (*5*) as an entirely unrelated condition. The most likely explanation in this case is that two separate diseases occurred more or less simultaneously in the same individual. Her arthritis preceded the skin involvement by six months and did get much worse when the latter appeared. It was believed that her sarcoidosis caused an exacerbation of the arthritis, just as most infections will cause a flareup of arthritis. Gold sodium thiosulfate, 13 injections of 20 gm. each given intravenously at weekly intervals, produced no improvement. Physiotherapy maintained motion in all joints except the elbows. Injections of streptococcal vaccine and tablets of glucuronic acid were ineffective. Salicylates and supportive therapy produced slow improvement. Four similar cases have been reported but each differed from the case presented here.—*Sarcoidosis associated with polyarthritis, M. W. Davis & R. Q. Crotty, Ann. Int. Med., April, 1952, 36: 1098.*—(*T. H. Noehren*)

Pulmonary Lesions in Acute Reticulo-Endotheliosis.—Fatal reticulo-endotheliosis occurred in a 16-month-old infant. The most striking symptoms were referable to the respiratory system, death being due to acute respiratory insufficiency secondary to the pulmonary changes. Roentgenographically, the chest lesions were diffuse miliary infiltrations throughout both lungs. The lungs were diffusely involved by foci of gray-white consolidation, often associated with small cysts or tiny emphysematous blebs. Microscopic examination showed two principal cell types in the lungs: (*1*) a large, round or oval cell with an oval vesicular, or occasionally reniform, nucleus, a sharp nuclear border, and indistinct amphoteric cytoplasm; (*2*) a larger cell, irregular in outline, with a homogeneous, fairly dense, nuclear pattern and a vacuolated cytoplasm. Similar lesions were present in the skin, spleen, bone marrow, thymus, lymph nodes, and meninges. A unique feature was emphysema of the lung, the mediastinum, and the subcutaneous tissues of the neck and upper anterior chest. The extensive pulmonary lesions were lethal before the marrow changes became demonstrable by roentgenography. Atelectasis arising from cysts of the lung, mediastinal emphysema, or spontaneous pneumothorax is the mechanism of death in some of these cases.—*Acute reticulo-endotheliosis (Letterer-Siwe disease), R. A. Nelson & B. E. Stofer, A. M. A. Am. J. Dis. Child., April, 1952, 83: 475.*—(*M. J. Small*)

Endocarditis in Pneumonia.—In 4 cases of bacterial pneumonia complicated by acute endocarditis, autopsy findings revealed dynamic aortic regurgitation, which is usually the result of early valve destruction. This emphasizes the importance of early diagnosis of the endocardial infection and of prompt and adequate antibiotic therapy.—*Acute endocarditis as a complication in bacterial pneumonia, E. Applebaum, M. S. Bruno, & E. Hochstein, J.A.M.A., January 12, 1952, 148: 93.—(H. Abeles)*

Histoplasmosis in Epidemic Form.—A 36-year-old white soldier was admitted with chills, fever, sweating, general aching, headache, and nonproductive cough. A chest roentgenogram showed diffuse mottling throughout both lung fields, with bilateral enlargement of the hilar lymph nodes. A diagnosis of interstitial pneumonia, type undetermined, was made. In the next few days, 25 other soldiers in his company were admitted with similar complaints. They all had stayed for a few hours in an abandoned storm cellar. These cases were reported earlier under the title "An Unusual Pulmonary Disease". Six years later a chest roentgenogram of the first patient revealed miliary and somewhat larger calcified nodules throughout both lung fields. The skin test and a complement fixation test were positive for histoplasmosis, and the diagnosis of benign histoplasmosis was made. It is believed that the other members of the affected group also had had histoplasmosis. Other similar epidemics have been reported without definite diagnosis. A common feature of these outbreaks was the exposure to dust, especially that associated with the habitation of pigeons, chickens, and rodents.—*Histoplasmosis in epidemic form, B. Schwartz & L. J. Spitz, A. M. A. Arch. Int. Med., April, 1952, 89: 541.—(G. C. Leiner)*

Klebsiella Pneumoniae Meningitis and Pneumonia.—*Klebsiella pneumoniae* (Friedländer's bacillus) meningitis is infrequent. To 118 cases collected from published reports is added a case of *K. pneumoniae* meningitis with bacteremia and pneumonia, with recovery on penicillin, aureomycin, and streptomycin therapy. The most frequent *K. pneumoniae* infections associated with meningitis are those of the ears, the upper and lower respiratory tract, and wounds. In infants the primary focus is most frequently undetermined. Diabetes mellitus is associated with *K. pneumoniae* infections beyond its expected occurrence in random population groups. The presence of glycosuria and ketosis during the acute stages of the disease, however, does not necessarily indicate true diabetes mellitus. No definite clinical characteristics distinguishable from those of other forms of purulent meningitis are evident. A gelatinous spinal fluid sometimes occurs. Petechiae have been noted. Streptomycin, aureomycin, chloramphenicol, and terramycin all exert an antibacterial effect upon most strains of *K. pneumoniae*. Which of these drugs is most effective in the treatment of *K. pneumoniae* meningitis remains to be determined (Authors' summary).—*Klebsiella pneumoniae meningitis: Review of the literature and report of a case with bacteremia and pneumonia, with recovery, A. J. Thompson, E. B. Williams Jr., E. D. Williams, & J. M. Anderson, A. M. A. Arch. Int. Med., March, 1952, 89: 405.—(G. C. Leiner)*

Q Fever in Austria.—The author has seen 360 cases of Q fever in Austria since 1948. The complement fixation reaction with *Rickettsia burneti*, done in 100 patients, gave a weak reaction in 40 per cent of the cases, no reaction in 60 per cent. The diagnosis was made on basis of the clinical picture, the leukocyte count, and the increased erythrocyte sedimentation rate. In 70 per cent of the cases, the disease had a chronic course with relapses. It usually began with subfebrile temperature, fatigue, dizziness, and headache. The following clinical pictures were seen: pain at the level of the diaphragm; virus fever without symptoms referable to any organ; pulmonary infiltrations; peritoneal syndrome; episcleritis; pharyngitis and laryngitis; sinus involvement; renal involvement; involvement of the nervous

system; thrombosis; rashes, hypermenorrhea, abortion, myocardial involvement; icterus. The white blood count showed leukocytosis with neutrophilia and shift to the left. More women (64 per cent) had Q fever than men. All 53 patients treated with aureomycin responded well.—*Qu-Fieber in Oesterreich, R. Lass, Wien. klin. Wchnschr., February 29, 1952, 64: 159.*—(*G. C. Leiner*)

Kerosene Intoxication.—Most of 71 cases of kerosene ingestion were accidental and occurred when infants and children had access to kerosene left in the family drinking utensils. In many cases the air vent for a fuel reservoir was incriminated. The main symptoms were respiratory. All patients showed upper respiratory tract symptoms: coughing, gagging, or strangling. This usually attracted attention to the patient initially. Vomiting, lethargy, drowsiness, stupor, or convulsions occurred much less often. Of the 44 patients who had chest roentgenograms, 26 had evidence of pneumonia; 29 patients of the entire series were considered to have a pneumonic process. The roentgenographically demonstrable lesions were all in the lower lobes: 8 in the right lower lobe, 5 in the left lower lobe, and in 13 cases both lower lobes were involved. The auscultatory findings included coarse breath sounds, rhonchi, rales, and wheezes but, in 19 cases with positive roentgenographic findings, no positive auscultatory findings were obtained. Treatment was aimed at rapid, thorough removal of the ingested material from the gastrointestinal tract. This necessitated the use of the stomach tube and copious lavage. Prompt lavage significantly reduced the incidence of pneumonia. There were no deaths in this series.—*Kerosene intoxication, R. B. Olstad & R. M. Lord, Jr., A. M. A. Am. J. Dis. Child., April, 1952, 83: 446.*—(*M. J. Small*)

EKG in Acute Cor Pulmonale.—A group of 8 patients with acute cor pulmonale caused by pulmonary infarction or massive pulmonary embolism and verified by clinical signs, roentgenographic evidence, or post-mortem examination was studied by means of serial electrocardiograms. Augmented extremity lead and unipolar precordial lead records showed a shift of the interventricular transitional zone to the left (clockwise rotation of the heart) in all 8 patients; in 7 of these, the shift was detectable early in the course of the disease. Increase in the vertical position of the heart was found in 6 patients and evidence of right ventricular dilatation in 4. Evidence of coronary insufficiency was present in 4 patients. It was consistently associated with pre-existent coronary artery disease and occurred uniformly in the older age group. Auricular arrhythmias were detected in 3 patients. In all instances they occurred many hours after the initial infarction or embolism. Right auricular dilatation was present in 2 patients and was also a delayed phenomenon. Transient right bundle branch block was noted in one patient as an early electrocardiographic change. Review of the records obtained revealed that the so-called "staircase" ascent of the S-T segment in standard lead I, previously described in acute cor pulmonale, is produced when an increase in the vertical position of the heart with clockwise rotation is superimposed upon changes associated with coronary insufficiency. Inversion of T waves in leads CF_2 and/or CF_4 is apparently caused by clockwise rotation of the heart, usually in conjunction with evidence of right ventricular strain. The presence of a Q wave in leads III and/or aV_F occurred as a manifestation of the rotational changes in acute cor pulmonale in the absence of posterior myocardial infarction. The rapidity of the electrocardiographic changes is important in differentiating acute cor pulmonale from myocardial infarction. The electrocardiographic patterns produced by rotational changes are more consistent than any other evidence in acute cor pulmonale. If serial records are obtained at the onset, even minor degrees of shift of the transitional zone can be shown to be of diagnostic significance (Authors' summary.)—*The electrocardiographic diagnosis of acute cor pulmonale, M. Eliaser, Jr. & F. Giansicurasa, Am. Heart J., April, 1952, 43: 533.*—(*G. C. Leiner*)

Precordial Migraine.—In a series of 684 patients suffering from migraine, 158 had some distress which suggested the presence of precordial types of migraine. Palpitation was complained of by 83, simple tachycardia by 14, and paroxysmal tachycardia by 3; chest pain was predominant in 92 patients and anginal pain in 37. There were 24 abnormal electrocardiograms in the group of 158. Any combination of the so-called cardiac factors could be present during the seizure of cephalgia. There was no correlation between patients with abnormal electrocardiograms or hypertension and those who had the precordial type of migraine.—*Precordial migraine, J. F. Briggs & J. Bellomo, Dis. of Chest, June, 1952, 21: 635.—(E. A. Rouff)*

Corticotropin for Acute Laryngotracheitis.—Of 10 patients with severe laryngotracheitis, 5 were selected as controls. The remaining 5 received corticotropin and all were on a standard regimen employing a croupette tent, sedation, and antibiotic therapy. Of the 5 controls, 4 required tracheotomy within two hours after admission. The 5 treated subjects received corticotropin intramuscularly following an initial observation period of less than two hours, without improvement. The 5 treated children, eighteen months to twelve years old, were given 15 to 40 mg. of corticotropin. During a further observation period of approximately one hour, no beneficial effects were noted and tracheotomy was necessary for all 5. Larger doses or a different method of administration may produce better results.—*Corticotropin (ACTH) in the treatment of acute laryngotracheitis, J. A. Turner & E. A. Morgan, A. M. A. Am. J. Dis. Child., April, 1952, 83: 440.—(M. J. Small).*

Cortisone for Asthma.—Of 21 patients with intrinsic bronchial asthma who previously had been given courses of cortisone or combined cortisone and corticotropin therapy, the majority had severe intractable disease with decreasing response to bronchodilators. The response to therapy was unpredictable; 9 patients had marked improvement, 5 showed slight improvement, and the remaining 7 had no improvement at all. The majority of patients who had only slight or no improvement with cortisone suffered from severe emphysema and a long history of chronic bronchitis prior to the onset of asthmatic symptoms. The response to cortisone was dramatic in 3 cases of status asthmaticus. Dosages of 200 mg. for one day decreasing to 100 mg. daily for several days thereafter were sufficient. The majority of cases relapsed in one week to three months after cortisone was discontinued. The oral route proved as effective as the intramuscular. Side effects were infrequent. Cortisone should be tried only in those patients in whom all other forms of medication have failed.—*Cortisone in asthma, H. S. Mitchell & G. Cameron, Canad. M. A. J., April, 1952, 66: 317.—(E. A. Riley)*

Cortisone for Asthma.—Orally administered cortisone relieved the symptoms of intractable bronchial asthma in 26 of 31 courses of treatment given to 22 patients. Relief occurred within five to seventy-two hours after the onset of therapy. The symptoms of 18 patients relapsed within two weeks after cortisone was discontinued. Once an optimal dose of cortisone has produced complete relief, the simultaneous administration of suboptimal doses of cortisone and such types of drugs as bronchodilators, iodides, antibiotics, and other well-tried general measures may maintain a much longer remission. Cortisone therapy is not a substitute for allergic management.—*Oral cortisone therapy in intractable bronchial asthma, E. Schwartz, J.A.M.A., December 29, 1951, 147: 1734.—(H. Abeles)*

Acetic Acid Aerosol for Pseudomonas Bronchiectasis.—Because acetic acid has a marked bactericidal effect on the gram-negative organism *Ps. aeruginosa*, acetic acid aerosol was used for the treatment of a patient with purulent bronchiectasis. Her respiratory tract cultures repeatedly showed *Ps. aeruginosa* and her symptoms had not responded to the customary antimicrobial therapy. Although the organism persisted, there was a striking

decrease in the patient's cough and improvement in her general condition after one month of therapy. Discontinuation of treatment led to a return of the cough, and resumption of treatment resulted in a marked subsidence of this troublesome symptom (Author's summary).—*Acetic acid aerosol in treatment of purulent bronchiectasis due to Pseudomonas aeruginosa, W. W. Currence, A. M. A. Am. J. Dis. Child, May, 1952, 83: 637.*—(*M. J. Small*)

Pneumoperitoneum for Respiratory Insufficiency.—Pneumoperitoneum was instituted in 8 cases of emphysema. In 2 cases the treatment appeared to hasten the fatal outcome, one showed transient benefit and then died after two weeks, 4 were benefited subjectively for a short time and then were lost to follow-up. In only one could lasting benefit be demonstrated. In this case, subjective improvement was striking and the diaphragm regained its normal curve and excursion, but there was no alteration in the ventilatory function when tested. It is concluded that pneumoperitoneum has a place in certain cases of emphysema in which the difficulty is purely a ventilatory one. Contraindications are: diffusion difficulties, marked bronchorrhea, pleural symphysis, cardiac failure, visible bullae, coronary insufficiency, and certain accessory conditions such as hernia. It is often difficult to determine whether one is in fact dealing with a pure ventilatory deficiency.—*Essai de traitement par le pneumopéritoine des certaines formes sévères de l'insuffisance respiratoire acquise, P. Lagèze, R. Touraine, R. Blanc, & J. Ternamian, Poumon, February, 1952, 8: 99.*—(*F. S. Lansdown*)

Continuous Suction for Spontaneous Pneumothorax.—A method of treatment with ontinuous intrapleural suction for spontaneous pneumothorax was used for 10 patients. A Foley catheter was introduced after fluoroscopic inspection of the pleural space, any fluid or blood present was withdrawn, and then the catheter was connected to a suction machine with two water-trap bottles in the circuit. Re-expansion was usually obtained within a few minutes, but suction was maintained for three days before the suction machine was replaced by a simple water-trap for another two days.—*Treatment of spontaneous pneumothorax by means of continuous intrapleural suction, F. L. Kreutzer, L. G. Brizzolara, & W. L. Rogers, Dis. of Chest. June, 1952, 21: 663.*—(*E. A. Rouff*)

Thrombophlebitis in Pulmonary Malignancy.—Four cases provide instances where thrombophlebitis antedated primary pulmonary neoplasm. None of the 4 cases responded to adequate anticoagulant therapy; 3 had recurrent episodes of thrombophlebitis and were considered at one time to have thromboangiitis obliterans. The diagnosis of primary pulmonary, malignant neoplasm was first made one and one-half to six months after the first episode of thrombophlebitis.—*Recurrent thrombophlebitis in obscure malignant tumor of the lung: Report of four cases, M. M. Fisher, L. A. Hochberg, & N. D. Wilensky, J.A.M.A., November 24, 1951, 147: 1215.*—(*H. Abeles*)

Prophylaxis of Pulmonary Embolism by Elastic Compression.—It seemed logical that venous return from the legs would be hastened by the use of elastic supports which exert their effect early, continuously, and directly in the vicinity where thrombi are prone to occur. Such compression was used in a series of patients subjected to extensive surgical operations and peculiarly susceptible to venous thrombosis because of advanced age, obesity, heart disease, carcinoma, blood disturbances, antecedent thrombo-embolism, arterial insufficiency, varicose veins, or extensive operations. In many instances, major vascular channels were subjected to operative trauma. All patients were over the age of 40 years and almost 40 per cent were more than 60 years old. Fiber elastic bandages, 3 to 4 inches wide, were placed on both legs from the ball of the foot to the knee every morning for two weeks postoperatively. In this series of 392 patients, surgery was performed on 476 separate occasions. Clinical evidence of deep venous thrombosis was encountered in only 3 and pulmo-

nary embolism in but one patient. All of these patients recovered. The number of patients is too small to permit definite conclusions, but their predisposition to intravascular clotting appears to warrant the assumption that clotting was reduced by means of elastic compression.—*Elastic compression in the prophylaxis of postoperative thrombo-embolism, I. R. Trimble & D. H. Lynn, Ann. Surg., May, 1952, 135: 681.*—(*M. J. Small*)

Intrathoracic Gastrogenic Cysts.—An intrathoracic gastrogenic cyst was successfully removed, and the patient remained in good condition subsequently. Certain vertebral anomalies were noted, and tomograms showed longitudinal defects in the vertebral bodies and arches, chiefly in the lower cervical and upper thoracic regions. The frequent occurrence of intrathoracic gastrogenic cysts with certain anomalies of the cervical and thoracic vertebrae suggests that the two perhaps are related because adherence of notochord and foregut persists. Descent of the stomach would then cause anomalies in the vertebral bodies (notochord) in this part of the spine, while the corresponding part of the stomach would be pinched off.—*Pathogenesis of intrathoracic gastrogenic cyst, G. M. H. Veeneklaas, A. M. A. Am. J. Dis. Child., April, 1952, 83: 500.*—(*M. J. Small*)

Diaphragmatic Hernia.—A woman gave birth to two children, each of whom died shortly after delivery with congenital diaphragmatic hernia. The occurrence in siblings had been reported only once previously.—*Congenital diaphragmatic hernia in siblings, E. E. Philipp & M. D. Skelton, Brit. M. J., June 14, 1952, No. 4771: 1283.*—(*E. A. Riley*)

Congenital Tracheo-Esophageal Fistula.—An infant had esophageal atresia coexistent with tracheo-esophageal fistula and duodenal atresia, as well as other anomalies. A loud to-and-fro rush of air within the stomach with each respiration appears to be an important physical sign in this combination of anomalies. This complex situation should be treated first by laparotomy with gastrostomy and gastroenterostomy, and second by thoracotomy with closure of the tracheo-esophageal fistula and exteriorization of the upper esophageal stump. Procedures to reconstruct the continuity of the gastrointestinal tract would be done electively after the age of two years (Authors' summary).—*Congenital atresia of the esophagus with tracheo-esophageal fistula, duodenal atresia, and other anomalies, W. C. McGarity, O. A. Abbott, & L. W. Grove, Ann. Surg., April 1952, 135: 566.*—(*M. J. Small*)

Congenital Biliary-Respiratory Communication.—A tracheocholedochal tract is a developmental anomaly not previously described. It was found in a five-month-old girl, whose illness began four days after birth, and was characterized by episodes of atelectasis, pneumonitis, and the expectoration of large amounts of green mucoid material containing bile. Iodized oil instilled into the trachea demonstrated a tract arising from the medial aspect of the right main bronchus just below the carina and extending directly downward through the mediastinum parallel to, and anterior to, the esophagus. At the level of the diaphragm this tract coursed laterally toward the right and appeared to pass through the shadow of the liver to enter the duodenum at about the level of the ampulla. Before surgical exploration could be started, the infant suddenly became extremely cyanotic and died, apparently from massive airway obstruction. Post-mortem examination confirmed the presence of the anomalous tract connecting the right main bronchus and the hepatic duct. Histologically, the upper portion of the tract resembled trachea; the middle part, esophagus; and the lower portion, bile duct.—*Congenital direct communication between biliary system and respiratory tract, E. B. D. Neuhauser, M. Elkin, & B. Landing, A. M. A. Am. J. Dis. Child., May, 1952, 83: 654.*—(*M. J. Small*)

Carcinoma of Trachea.—A 66-year-old white man was admitted complaining of upper abdominal pain and daily hemoptysis. The admission diagnoses were: bronchial asthma, chronic bronchitis, bronchiectasis, and homologous serum hepatitis. There was the

history of injections for asthma given five months previously. The patient died after a rapid downhill course. The anatomic diagnoses were: primary undifferentiated carcinoma in the upper third of the trachea on its posterior wall; liver and periportal lymph nodes with a metastatic carcinoma; chronic bronchitis; pulmonary emphysema and cylindrical bronchiectasis; pulmonary arteriosclerosis; pulmonary edema; myofibrosis cordis and coronary sclerosis; generalized icterus. The total nun.ber of cases of carcinoma of the trachea reported is less than 200. Most cases occur in males. The localization is most frequently in the lower third of the posterior wall. Four groups are distinguished histologically: squamous cell carcinoma, cylindroma, adenocarcinoma, hemangioendothelioma. Carcinoma of the trachea metastasizes rapidly and occasionally widely. There are neither pathognomonic signs nor symptoms; cough, dyspnea, wheeze, and hemoptysis occur frequently. The diagnosis can be made only by bronchoscopy. The treatment of tumors of the upper trachea consists of electrocoagulation and radon seeds. A number of cures have been achieved.—*Primary carcinoma of the trachea, H. Zarowitz & J. B. Hoffman, A. M. A. Arch. Int. Med., March, 1952, 89: 454.*—(*G. C. Leiner*)

ANTIMICROBIAL THERAPY

Isoniazid in Guinea Pigs.—Treatment with isoniazid was initiated on the forty-second day after the tuberculous infection of 20 young male and female guinea pigs that weighed 170 to 270 gm. Each guinea pig was experimentally infected with approximately 50 tubercle bacilli. For treatment purposes, the animals were divided into two groups of 10. In each group, 6 of the animals were treated daily with 20 mg. per kg. of isoniazid. Four animals in each group served as controls. After four weeks' treatment a distinct difference in the underlying pathology was manifested between the treated and the untreated animals. The untreated animals showed lymphoglandular and hematogenous spread of the primary infection to the lungs, liver, kidney, and spleen. Lympho-glandular spread in the treated animals was very much suppressed, and the hematogenous spread was almost completely stopped. The toxicity with the therapeutic dose used was meager. Experimentally, the effectiveness of isoniazid is equal to that of combined streptomycin–*p*-aminosalicylic acid treatment. Isoniazid thus is a very effective tuberculostatic, and possibly tuberculocidal, substance.—*Erste Erfahrungen mit Rimifon "Roche" bei experimenteller Meerschweinchentuberkulose, E. Uehlinger, R. Siebenmann, & H. Frei, Schweiz. med. Wchnschr., March 29, 1952, No. 13: 335.*—(*E. Dunner*)

Isoniazid.—Chiefly because of American studies, the toxicity, pharmacology, chemotherapeutic action, and clinical results of isoniazid can be summarized. Large doses of isoniazid may cause tonic-clonic convulsions in animals. Histologic examination indicates mild hyperemia of the spleen and mild parenchymatous degeneration of the liver, kidney, and testes. Pharmacologically, isoniazid has broncholytic effects approximating one-twentieth that of atropine. The new drug has no antihistaminic properties and does not suppress secretion from the tear ducts or salivary glands. Isoniazid has considerable *in vitro* effect on human-type tubercle bacilli but relatively little effect on the bovine type. *In vivo*, tuberculosis of the mouse, guinea pig, and monkey is favorably influenced. The drug apparently has a specific action against *Mycobacterium tuberculosis*. In patients it favorably influences appetite after approximately two weeks' treatment and decreases cough and expectoration. The sedimentation rate is not appreciably affected. Side effects due to the drug are mild but may be manifested by obstipation, difficulty in micturition, increased reflexes, and dizziness. The obstipation can be relieved by Prostigmine. Isoniazid is generally prescribed in tablet form, using a daily oral dose of 2 to 5 mg. per kg. of body weight, and may be administered in 3 doses after meals.—*Orientierung über das Antituberculoticum Rimifon "Roche," B. Fust, Schweiz. med. Wchnschr., March 29, 1952, No. 13: 333.*—(*E. Dunner*)

Treatment of Lower Lobe Cavity.—Phrenic nerve interruption yielded better results than streptomycin therapy in controlling cavities in the apical segment of the lower lobes. Of 40 cases treated with phrenic nerve interruption, cavity closure was obtained in 22 cases (55 per cent) and the lesions remained in the arrested stage for a minimum of three years; on the average, sixty-six months. Cavity closure was observed in 10 of 30 patients who were treated with 72 gm. of streptomycin and followed for a few months. The series treated with phrenic nerve surgery included cavities of different age, size, and character; in the streptomycin series most of the cavities were recent. In view of the poor results on conservative treatment, the use of phrenic nerve interruption with streptomycin therapy is recommended for the treatment of cavities located in the apical segment of the lower lobes —*Contribución al tratamiento de las cavernas de lóbulo inferior del pulmón* (*Los resultados lejanos de la frenicectomia en las cavernas de vértice de lóbulo inferior, comparados con los resultados inmediatos del tratamiento antibiótico*), *J. T. Sanz, Rev. españ. de tuberc., January, 1952, No. 202: 27.*—(*L. Molnar*)

Streptomycin Resistance.—A series of 115 patients with acute progressive bilateral pulmonary tuberculosis unsuitable for collapse therapy were studied in a clinical trial of streptomycin and *p*-aminosalicylic acid (PAS). All were treated for three months with 1.0 gm. of streptomycin daily; in addition, 42 were given 20 gm. of PAS daily (SP 20), 39 had 10 gm. (SP 10), and 34 had 5 gm. (SP 5). Patients were assigned to one or another treatment group by random selection. Gastrointestinal disturbance was infrequent (12 to 15 per cent) and mild in the two groups on lower doses of PAS; in the group receiving 20 gm. of PAS, the incidence was 52 per cent. The radiologic assessment of change at the end of six months shows no difference among the three groups. The proportion showing improvement was 87 to 88 per cent. No differences were found among the groups. In the third month, 32 per cent of SP 5 cases had resistant strains, compared with 8 per cent in the SP 10 group and 4 per cent in the SP 20 group. Subsequently, the figures rose in both groups on lower doses, and remained very low in the SP 20 group. In the fourth month the proportion of resistant cases was 47 per cent in the SP 5 group, 43 per cent in the SP 10 group, and 15 per cent in the SP 20 group. In the sixth month the corresponding figures were 36 per cent, 30 per cent, and 7 per cent. Reversion to sensitivity was observed frequently, in all three groups, in cases with moderately resistant strains (Authors' summary).—*The prevention of streptomycin resistance by combined chemotherapy, A Medical Research Council Investigation, Brit. M. J., May 31, 1952, No. 4769: 1157.*—(*E. A. Riley*)

Combined Chemotherapy.—The results of three Medical Research Council trials of chemotherapy for pulmonary tuberculosis have been amalgamated to provide material for a detailed analysis. A total of 388 patients with similar forms of acute progressive bilateral pulmonary tuberculosis have been studied in these trials: 52 were treated by rest in bed only, 109 by streptomycin alone, 59 by *p*-aminosalicylic acid (PAS) alone, 73 by streptomycin plus 5 or 10 gm. of PAS daily, and 95 by streptomycin plus 20 gm. of PAS daily. The results at six months after the start of treatment were much better in all groups on chemotherapy than in the group on rest alone. There was no difference apparently between the groups having different daily doses of PAS plus 1.0 gm. of streptomycin daily. There was no difference between the results in men and women. The percentage of patients developing streptomycin-resistant strains was much higher in patients treated with streptomycin only than in those on combined therapy; among the latter it was higher in those patients for whom the daily dose of PAS was 5 or 10 gm. than in those receiving 20 gm. daily. The clinical significance of streptomycin resistance is shown by the finding that, in patients with a similar initial condition, the results were worst in those who developed high degrees of drug resistance.

Moderate drug resistance seems to be of less clinical significance (Authors' summary).—*Chemotherapy of pulmonary tuberculosis in young adults: An analysis of the combined results of three medical research trials, M. Daniels & A. B. Hill, Brit. M. J., May 31, 1952, No. 4769: 1162.—(E. A. Riley)*

Intraspinal Streptomycin in Miliary Tuberculosis.—Routine intraspinal administration of streptomycin in the treatment of miliary tuberculosis, despite the absence of clinical and laboratory evidence of meningitis, was used because severe meningitis may occur in such cases during intensive systemic treatment with streptomycin. The following schedule was used for the combined treatment: intramuscular injections of streptomycin in doses of 50 mg. per kg. of body weight daily for two months and 30 mg. per kg. daily for the following three months; orally, *p*-aminosalicylic acid in doses of 0.3 gm. per kg. of weight in courses of ten days with interruptions of three days between the courses; and intraspinal injections of streptomycin in doses of 20 to 30 mg. every second day for three months, and the same dosage intraspinally every third day for another two months. Of 20 cases of miliary tuberculosis with no evidence of meningeal involvement at the onset of the disease, or with laboratory evidence only, 10 were not treated intraspinally from the beginning: in this group there were 3 fatal cases of meningitis, one child is still under treatment for meningitis, and 6 were discharged apparently cured. In the second group of 10 cases, intraspinal therapy was employed from the beginning; no meningeal complications were noted, and all children were discharged with arrested disease. Using one of the salts of streptomycin, no untoward side effects were observed in the intraspinally treated group.—*Zur "prophylaktischen" intralumbalen Streptomycinbehandlung der Miliärtuberkulose, K. Wechselberg, Deutsche med. Wchnschr., February 29, 1952, No. 9: 276.—(L. Molnar)*

Deafness and Dihydrostreptomycin.—The results in a series of 26 cases of tuberculous meningitis were compared with those in a series of 51 cases treated with dihydrostreptomycin. While the latter showed a 67 per cent recovery rate as compared with 50 per cent in the former series, 50 per cent of the survivors in the second series were deaf whereas only one of 13 survivors in the first series had impairment of hearing. The earliest date for onset of deafness was three months from the beginning of treatment; the average time, five months. In a few cases, deafness developed after completion of treatment.—*Deafness with use of dihydrostreptomycin in tuberculous meningitis, J. T. Naismith, Brit. M. J., April 12, 1952, No. 4762: 796.—(E. A. Riley)*

Thiosemicarbazone Toxicity.—Thiosemicarbazone was administered to 10 healthy rabbits in daily doses between 12.5 and 100 mg., a total of 125 mg. to 2.25 gm. being given over ten to forty days. Post-mortem examination revealed moderate hyperemia and slight degenerative changes in the liver, in the kidneys, and in the myocardium. The histologic examination of these organs showed degenerative changes in the cytoplasm of the parenchymatous cells, while the nuclei were unaffected. These changes were qualitatively similar in the various groups of rabbits treated on various regimens, and they were more pronounced in the animals treated with larger doses over longer periods. These alterations in the cells are of a reversible character and do not represent contraindications to the therapeutic use of thiosemicarbazone, at least within the dosage range generally adopted at present.—*Modificazioni istopatologiche viscerali da tiosemicarbazone (Studio sperimentale nel coniglio), L. Corti & G. Romualdi, Arch. E. Maragliano, November-December, 1951, 6: 1023.—(L. Molnar)*

Diethylaminoethyl Penicillin.—The diethylaminoethanol ester hydriodide of penicillin (estopen) is biologically inactive until hydrolysis liberates free benzyl-penicillin. Experiments with laboratory animals show that, after injection of the esters into guinea pigs and rats with an artificially induced *Haemophilus pertussis* bronchopneumonia, significantly

higher penicillin levels are detectable in the lungs than in the blood of the infected animals, particularly within the first six hours. These levels were higher than the levels in animals treated with procaine penicillin or with sodium penicillin. Further experiments showed that the ester is concentrated in the lungs alone and that intracerebrally infected mice have no selective concentration in brain tissue. This affinity is a specific property of lung tissue, particularly when diseased, and is not shown by other organs. Inflamed lung tissue has approximately 50 per cent of normal esterase activity; this reduction may be partly responsible for the longer persistence of the ester in these lungs. Another reason is the finding that part of the ester is protected from hydrolysis by being bound to constituents of inflamed lung tissue, particularly proteins. Other factors involved may be related to specific features of lung structure and function.—*Accumulation of diethylaminoethanol ester of penicillin in inflamed lung tissue, J. Ungar & P. Muggleton, Brit. M. J., June 7, 1952, No. 4770: 1211.*—(*E. A. Riley*)

LABORATORY STUDIES

Resistance to Human Tuberculosis in Rabbits.—Most humans infected with tubercle bacilli arrest their disease. To study the nature of human resistance to tuberculosis, by animal experimentation, there must be produced in animals a disease which is rarely fatal. Several inbred strains of rabbits inhaled for a measured time an aerosol containing a known number of bacillary units, mostly single bacteria, of viable *M. tuberculosis* H37Rv. Two of the rabbit strains possessed great resistance to virulent bovine tubercle bacilli. The remaining strains showed the usual lack of resistance to bovine bacilli. After several months there was no tuberculosis in the lungs of the resistant animals; there was variable and often extensive disease in the susceptible rabbits. This difference was due to the rapid destruction after a brief period of multiplication of the human-type tubercle bacilli in resistant rabbits. On the other hand, in susceptible animals, the bacilli multiplied profusely for a long time. Native resistance is apparently a tendency to develop acquired resistance rapidly. Native susceptibility is essentially a tendency to develop acquired resistance late or ineffectively. Genetic factors play a role in the ability to survive the disease. The more rapid destruction of bacilli in the resistant animals rapidly releases their antigens and enhances the development of allergic sensitivity and antibodies. This was shown with allergy studies and hemagglutination tests for the presence of antiobdy. Histologically, the lesion in the susceptible rabbit consists of young epithelioid cell centers swarming with tubercle bacilli. These are surrounded by a great profusion of rapidly growing mononuclear cells infiltrating and consolidating the neighboring lung parenchyma. In the lungs of the resistant animal there are extremely infrequent collections of epithelioid cells, some of which are quite mature and in which tubercle bacilli are rarely found. From six to fifteen times as many units of human-type tubercle bacilli must be inhaled by a genetically resistant animal as by a susceptible animal to yield the same number of primary foci; the greater the genetic resistance, the fewer the initial primary foci. The genetic resistance of rabbits to the inhaled tubercle bacilli may depend on the presence of alveolar phagocytes capable of developing the power to destroy or inhibit the growth of bacilli in their cytoplasm. The prevalence of such phagocytes is subject to hormonal and immunologic influences. Irrespective of genetic influences, there must be some growth before resistance is manifest.—*On the response of genitically resistant and susceptible rabbits to the quantitative inhalation of human tubercle bacilli and the nature of resistance to tuberculosis, M. B. Lurie, S. Abramson, & A. G. Heppleston, J. Exper. Med., February 1, 1952, 95: 119.*—(*J. S. Woolley*)

Spermine and Tubercle Bacilli.—The multiplication of tubercle bacilli *in vivo* probably is limited by mechanisms other than those of the usual immune processes. For example, acid-fast organisms do not increase in numbers in the central portion of caseous foci, where antibodies and phagocytic cells can hardly inhibit their growth. In the course of studies

to elucidate some of the biochemical factors influencing the fate of tubercle bacilli *in vivo*, it has been found that certain animal tissue extracts possess tuberculostatic activity *in vitro*. A crystalline substance capable of suppressing the growth of a variety of *Mycobacteria* was isolated from an extract of beef kidney in acidified dilute ethanol. This inhibitory material was equally active against virulent, attenuated, and avirulent variants of human and bovine tubercle bacilli when employed in a medium consisting of a phosphate buffer, asparagine, metallic ions, glucose, and bovine albumin in the concentrations ordinarily used for the cultivation of tubercle bacilli. It had little or no effect on saprophytic *Mycobacteria* and on several nonacid-fast microorganisms. Its inhibitory activity on the growth of tubercle bacilli was essentially independent of the size of the inoculum. The crystalline material appeared to exert a bactericidal action; tubercle bacilli maintained in the presence of the agent for four days failed to grow when transferred to inhibitor-free media. The findings were not appreciably altered by minor variations in the composition of the medium or in its pH. When certain preparations of whole serum replaced albumin, no antimycobacterial activity was observed; this activity was restored by adding bovine albumin (fraction V) to the medium containing whole serum. By chemical purification and analysis, the inhibitory material was identified as spermine, an organic base widely distributed in animal tissues.—*The effect of spermine on tubercle bacilli, J. G. Hirsch & R. J. Dubos, J. Exper. Med., February 1, 1952, 95: 191.—(J. S. Woolley)*

Tuberculin Sensitivity.—Using the response to intradermal tuberculin as a measure of allergic hypersensitivity in guinea pigs infected with BCG, it was found that: (*1*) Single subcutaneous injections of very small quantities of glucose-1-phosphate and of lysergic acid diethylamide diminish sensitivity. It is suggested that the latter causes an accumulation of hexose monophosphate responsible for desensitization. (*2*) Injected reduced glutathione prevents the desensitizing action of cortisone acetate, alloxan, ascorbic acid, and dehydroascorbic acid, but not of glucose-1-phosphate, N-acetylsphingosine, and the polyoxethylene esters. The authors' theory of the mechanism of cortisone desensitization is that cortisone facilitates the oxidation of ascorbic to dehydroascorbic acid, which in turn inhibits phosphoglucomutase. As a result, glucose-1-phosphate accumulates in the tissues and is intimately concerned with desensitization (Authors' summary).—*Influence of organic phosphates on tuberculin sensitivity in B.C.G. infected guinea pigs, J. W. Cornforth & D. A Long, Lancet, May 10, 1952, 1: 950.—(A. G. Cohen)*

Tuberculin Sensitivity.—The development of experimental tuberculosis in guinea pigs is markedly inhibited by injection of certain surface-active polyoxethylene ethers. Using the response to intracutaneous tuberculin as a measure of allergic hypersensitivity in albino guinea pigs infected with BCG, it was found that (*1*) single subcutaneous or intravenous injections of these drugs diminish sensitivity to a degree comparable to that of cortisone; (*2*) the chemotherapeutically active representatives of the series diminish tuberculin sensitivity, whereas the inactive members fail to do so; (*3*) their mode of action differs from that of cortisone, since it is independent of dietary factors and of thyroid activity; (*4*) neither D2a, a chemotherapeutically active detergent, nor cortisone, in heavy continual dosage, depressed skin sensitivity to diphtheria toxin or antitoxin levels in guinea pigs immunized with diphtheria toxoid. In this experiment the animals were sensitized with dead tubercle bacilli. Both drugs depressed tuberculin sensitivity (Authors' summary).—*Depression of tuberculin sensitivity in guinea pigs by certain antituberculous surface-active agents, P. D'A. Hart, D. A. Long, & R. J. W. Rees, Brit. M. J., March 29, 1952, No. 4760: 680.—(E. A. Riley)*

Experimental Aspects of Lung Cancer.—Most attempts to induce lung cancer in animals have failed or have produced only adenoma, especially in mice. Pulmonary adenoma

of mice probably is a special situation with little bearing on the majority of human lung cancers. Carcinomas more nearly like human cancers have been produced from mouse lung tissue transplantation, but this artificial procedure serves merely as a screening technique for testing various substances. Cancer of the lungs, aside from adenoma, has never been produced in any animal by any inhaled material. The materials suspected of causing cancer of the human lung are all potential inhalation hazards, but there is no method for experimental study of this problem. Potent carcinogenic hydrocarbons instilled or injected into the lungs in solution have almost invariably failed to elicit carcinomas of the respiratory epithelium, but have caused sarcomas to develop in the deeper tissues. Apparently carcinogens applied to the lungs in solution pass through the thin surface tissue to affect the underlying structures. When the lymphatic drainage of the lung is disturbed, as happens with tissue transplants, solutions of carcinogens readily elicit carcinomas from pulmonary epithelium. This may explain Andervont's production of carcinomas by inserting into the lungs threads coated with dibenzanthracene; the chemical then is crystalline and some crystals may be arrested on the lining epithelium. In planning experiments on lung cancers, careful consideration must be given to the physical state of the test materials presented to the lungs. Industrial physicians and hygienists are well aware that the particle size of noxious dusts plays a large role in determining the site of tissue reaction in the lungs. Thus, the small particles in siliceous dusts pass through the alveolar walls and exert their pathologic effects on the deeper tissues, whereas the larger fibers of asbestos are arrested in the terminal air spaces and produce a wholly different pathologic picture. Facts from experimental studies of silicosis and asbestosis may prove of value in future inhalation studies of materials suspected of causing pulmonary cancer.—*Lung cancer with special reference to experimental aspects, W. E. Smith, A. M. A. Arch. Indust. Hyg. & Occup. Med., March, 1952, 5: 209.*—(*T. H. Noehren*)

PUBLIC HEALTH AND EPIDEMIOLOGY

Tuberculin Reactions Among Pittsburgh Children.—Skin tests with Old Tuberculin among 537 patients tested showed 46 positive reactions and 6 equivocal results (9.6 per cent). For 15 of 99 Negroes (15 per cent) and for 37 of 438 white patients (8 per cent) the reactions were positive. Forty of the 52 reactors were from urban areas (Authors' summary).—*Incidence of skin-test reactions among children in the Pittsburgh district: II. Tuberculin, A. M. Carpenter, P. D. Spino, & J. C. Hadden, A. M. A. Am. J. Dis. Child., May, 1952, 83: 598.*—(*M. J. Small*)

Histoplasmin Reactions among Pittsburgh Children.—Routine testing with histoplasmin of 311 children admitted consecutively to the medical service of Children's Hospital, Pittsburgh, resulted in 2 positive reactions. Among 150 patients for whom the test was requested, there were 3 positive results. In 4 of the 5 cases in which the reaction to histoplasmin was positive, there was coexisting intrathoracic calcification. Joint pain was the presenting symptom in each of the 5 positive reactors (Authors' summary).—*Incidence of skin-test reactions among children in the Pittsburgh district: I. Histoplasmin, A. M. Carpenter & P. D. Spino, A. M. A. Am. J. Dis. Child., May, 1952, 83: 589.*—(*M. J. Small*)

Moniliin Reactions Among Pittsburgh Children.—Of 100 patients on whom skin tests were done during the winter months, 25 reacted positively to moniliin prepared from *Candida albicans;* 9 displayed equivocal reactions. During the summer months, 12 of 103 patients were positive reactors; 13 were equivocal reactors. This study contributes no new evidence which would validate employing the antigen, moniliin, as a diagnostic procedure (Authors' summary).—*Incidence of skin-test reactions among children in the Pittsburgh district: III. Moniliin, A. M. Carpenter, J. C. Hadden, & P. D. Spino, A. M. A. Am. J. Dis. Child., May, 1952, 83: 608.*—(*M. J. Small*)

Tuberculin Sensitivity.—Tuberculin testing has commonly been regarded a simple matter but there is considerable disagreement as to exactly what constitutes a positive or negative reaction. This question was studied in relation to BCG vaccination. When a Mantoux test was performed with 10 tuberculin units (equivalent to 0.0002 mg. of PPD), 45 per cent of subjects had reactions less than 2 mm. in diameter, a little more than 10 per cent had reactions of 2 to 3 mm., and fewer than 1 per cent had reactions of 6 to 8 mm. Above 8 mm. there was progressive increase in frequency with a peak at 16 to 18 mm. The low incidence of 6 mm. reactions suggests that this is the dividing point between positive and negative reactions. When similar tests were performed on children one year after BCG vaccination, the results gave a different distribution curve. The reactions were grouped symmetrically around a single central value, with no indication of a break. There was considerable variation, however, in the size of the reactions in subjects in three different countries. Applying the usual criterion of a positive reaction, 99 per cent of Danish, 87 per cent of Greek, and only 50 per cent of Egyptian children would be regarded as positive. The selection of the 6 mm. standard for each country is, therefore, not justified. There are several possible explanations for this difference in post-vaccination tuberculin sensitivity in the three countries. (*1*) Variations in the technique of intradermal injections of BCG might be a cause. More or less vaccine might be injected or it might be injected too deeply. Tests indicate, however, that minor variations in technique have little effect upon allergic response. (*2*) Variation in the allergenic potency of the vaccine is not a likely cause because BCG vaccine can be kept for relatively long periods and stored at moderate temperatures without much loss of allergy-producing potency. Small differences in the concentration of vaccine cause practically no change in allergy production, and vaccine containing a high proportion of heat-killed to living organisms produces an intense allergic response. (*3*) There is evidence that exposure to sunlight remarkably attenuates BCG. This might be the reason for the relatively weak response in Egypt, and is being investigated further.—*B.C.G. vaccination and tuberculin allergy, C. E. Palmer, Lancet, May 10, 1952, 1: 935.*—(*A. G. Cohen*)

BCG Tuberculin.—Pirquet tests with BCG tuberculin and with Old Tuberculin were done in approximately 400 children three and one-half months after they had been vaccinated with BCG. In 89 per cent of the children, the reaction to BCG tuberculin was stronger than to Old Tuberculin. The reactions to Old Tuberculin usually subsided faster than those due to BCG; both reactions disappeared earlier than similar reactions in patients with tuberculosis. Similar observations were made in 1,100 children three to four and one-half months after BCG vaccination, when patch tests were done with both forms of tuberculin. Testing with Old Tuberculin and BCG tuberculin helps in differentiating allergy due to BCG from allergy due to active tuberculosis.—*Zur Frage der Unterscheidung der Allergie nach tuberkulöser Infektion und nach BCG.—Impfung, O. Ruziczka, Wien. klin. Wchnschr., February 29, 1952, 64: 158.*—(*G. C. Leiner*)

BCG Vaccination.—In the region of Lille, France, 15,284 children, aged six to fourteen years, were vaccinated with BCG by scarification from 1947 to 1951. There was a comparable control group of 2,130 nonvaccinated children. Each child had a normal chest roentgenogram, no familial exposure to tuberculosis, and a negative intradermal tuberculin test. Fresh Pasteur BCG, containing 75 mg. of bacillary bodies per ml., was used most frequently. Tuberculin tests, physical examinations, and chest roentgenograms were repeated three or four months later and at one-year intervals therafter. There were 60 vaccinations in 1947, 790 in 1948, 8,436 in 1949, 4,639 in 1950, and 1,359 in 1951. The children vaccinated in 1950 and 1951 were not included; children vaccinated in 1947 through 1949 were thus observed two to four years, respectively. Three months after vaccination, there were 92.57 per cent tuberculin conversions. There were 93.68 per cent after one year, 93.95 per

cent after two years, and 84.29 per cent after three years. In 1949, 251 children were vaccinated with dry vaccine, with the same proportion of tuberculin reactors as a group of 274 children who received fresh BCG. A control group of 2,130 nonvaccinated children, six to twelve years of age, has been observed since 1949, at which time their tuberculin test was negative. In 1951, follow-up information was obtained on 93.18 per cent of these; the tuberculin test had converted to positive in 7.95 per cent in the first year and 7.65 per cent in the second year. In the nonvaccinated group, there was one case of tuberculous adenitis with suppuration. In the vaccinated group, lymph node hypertrophies were frequent (25.88 per cent), but adenopathies with suppuration and fistula formation were rare (5 cases, or 0.72 per cent). Two cases of pleural effusion occurred in the control group (1.4 per cent); both showed rapid resolution. In the vaccinated group, 4 cases of pleurisy with effusion were observed (0.57 per cent), developing three months, one year, and two years after vaccination. Absorption occurred in all cases within two months. Twelve cases of bronchiectasis (1.73 per cent) were detected in the vaccinated group, as compared with 3 cases among the control group (1.40 per cent). Of the vaccinated children, 3.32 per cent showed transient pulmonary infiltrations of nontuberculous, infectious etiology, as compared with 6.57 per cent among the control group. Definite hilar adenopathy was seen in 10.32 per cent of the controls (22 cases); in 21 of these, there was simultaneous conversion of the tuberculin reaction. In the BCG group, only 4 comparable adenopathies were observed (0.58 per cent). Pulmonary foci with enlargement of the corresponding mediastinal nodes were seen in 24 of the controls (11.25 per cent) and were always associated with conversion of the tuberculin reaction. Similar roentgenographic lesions were found in only 3 of the vaccinated children (0.43 per cent) and occurred five, ten, and twenty-four months after BCG vaccination. These changes regressed slowly in all cases. Routine roentgenograms three months after vaccination revealed 3 cases of segmental consolidation unaccompanied by clinical symptoms and showing rapid clearing. The etiology of these cases remains undetermined. None of the children with the described pulmonary changes had any known exposure to tuberculosis. Of the originally tuberculin-negative controls, 78 per cent showed conversion each year. It may be assumed that this represents the minimum incidence of superinfections to which the vaccinated group, living under similar conditions, was also subjected. In two years, 46 of the nonvaccinated children showed roentgenographic evidence of primary infection (21.58 per cent). In the vaccinated group, only 7 such cases were seen (1.01 per cent).—*15,000 vaccinations antituberculeuses par le B.C.G. effectuées, depuis 1947, par scarifications chez les écoliers de 6 a 14 ans. (Resultats éloignés. Documents cliniques et radiologiques systematiques. Comparison avec un groupe temoin non vacciné). Ch. Gernez-Rieux, M. Gerveis, P. Rauron, & A. Tacquet, Rev. de la tuberc., 1951, 15: 1154.*—(*V. Leites*)

BCG Vaccination.—At the BCG Center of the Laënnec Hospital in Paris, 1,387 persons were vaccinated with BCG from 1946 to 1951; 175 of these were children, the remaining 1,200 were adolescents and young adults, with a prevalence of medical students and student nurses. Most of these were vaccinated while continuing their training and exposure to tuberculosis. BCG was administered either by scarification or by intradermal injection of 0.05 mg. The vaccination was routinely preceded by Pirquet and Mantoux tests. Another Pirquet test was performed one week after vaccination in order to detect early or accelerated reactions in persons who might have been vaccinated in the pre-allergic period. A Mantoux test was performed two months after vaccination. The incidence of positive tuberculin reactions after two months was 70 per cent with the intradermal method and 77 per cent with the scarification method. Among the most exposed persons, the medical students, there were only 3 cases of pulmonary tuberculosis among 700 vaccinated students. In 26 other cases, a subsequent superinfection with virulent bacilli was inferred from a sudden

and considerable rise in the intensity of tuberculin allergy; in 16 cases, spontaneous reactivation at the site of an old Mantoux test or the vaccination scar was also attributed to superinfection. In 19 cases, vaccination was apparently performed in the pre-allergic period without serious consequences. Adenopathies were encountered in 1.6 per cent of all cases.—*Cinq ans de vaccinations par le B.C.G. au Centre de l'Hôpital Laënnec, E. Bernard, I. L. Herren-Schmidt, & I. Lacorne, Rev. de la tuberc., 1951, 15: 1150.*—*(V. Leites)*

BCG Vaccination.—Among 16 families some children were vaccinated with BCG and some were not; all had been exposed to a known active case of tuberculosis. Among the 22 children in the nonvaccinated group, 21 developed primary tuberculosis. Among the 22 BCG-vaccinated children, 2 showed some evidence of superinfection. The effect of BCG, which offers a relative rather than complete protection by raising the resistance to a subsequent superinfection with virulent organisms, was striking. It is likely that all of the vaccinated children were superinfected but only 2 showed a slight hilar reaction of short duration. A review of admissions to Norrtull's Hospital in Stockholm between 1945 and 1949 showed that 1,352 vaccinated children were admitted as compared with 7,279 nonvaccinated children. Twenty-six (1.9 per cent) of the vaccinated children had tuberculosis as compared with 599 (8.2 per cent) of the nonvaccinated children. There were 28 cases of tuberculous meningitis and/or miliary tuberculosis in the nonvaccinated group. Parallel with a rise in the number of vaccinated children admitted, there has been a marked decrease in the number of cases of primary tuberculosis.—*Tuberculosis in families with B.C.G.-vaccinated and non-vaccinated children, A. W. Dickie, Brit. M. J., March 29, 1952, No. 4760: 682.*—*(E. A. Riley)*

Sequellae of BCG.—Eight hundred children between the ages of one and fifteen years, hospitalized for various chronic conditions, were subjected to BCG vaccination by scarification. Following BCG administration, 21 cases of pulmonary or lymph node involvement were observed; 12 of these children were isolated for two to eight months; 4, for one or two months; and 5 were not isolated. There were 13 cases of mediastinal adenopathy, 5 cases of partial atelectasis, and 2 cases of total atelectasis. In 3 cases there was associated cervical and axillary adenopathy. Bronchoscopy confirmed the roentgenographic findings in 5 cases. In 14 of the children, the abnormalities were found on routine roentgenograms; the remaining 7 had upper respiratory symptoms. Most of the manifestations occurred after a delay averaging forty days post vaccination; in 4 cases, the interval was three or four months. These lymph node and lung changes were benign and regressed promptly. The authors are convinced that these manifestations were due to BCG ("Becegite"); the varying numbers of such incidents in different series is attributed to varying potency of the vaccine and different techniques of administration. In the discussion of this paper, it was pointed out that BCG was not bacteriologically proved to be a causative factor; the children might have been vaccinated in the pre-allergic period. On the other hand, the rapidity of regression makes infection with virulent human bacilli unlikely.—*Manifestations ganglio-bronchiques au cours de la vaccination par le B.C.G.; Constatations endoscopiques, P. Mounier-Kuhn & Imbert, Rev. de la tuberc., 1951, 15: 1105.*—*(V. Leites)*

BCG in Tuberculin Reactors.—A 14-month-old infant whose tuberculin test was negative by the Pirquet method was given BCG by scarification one week later. After four days the local reaction was very intense; this was followed by fever of 104°F. Roentgenograms revealed left hilar adenopathy. The Pirquet reaction became strongly positive. The child developed tuberculous meningitis and died. Tubercle bacilli, isolated from the spinal fluid, were highly virulent and showed resistance to streptomycin before administration

of this drug had been started. It is believed that in this case BCG produced an aggravating effect on a latent primary tuberculosis; it may be assumed that it was given either in the pre-allergic phase or in the course of active primary tuberculosis, the negative tuberculin test being due to incorrect technique or poor quality of the tuberculin. In another patient, sixteen years old, with a subclavicular infiltrate and a positive tuberculin test, a skin test with BCG was followed by temperature elevation, pleural effusion, and excavation of the infiltrate.—*Peut-on, sans inconvenients, vacciner au BCG un sujet allergique?, A. Dufourt & G. Despierres, Rev. de la tuberc., 1951, 15: 1111.—(V. Leites)*

Statistics in Tuberculosis.—In the first few years of life, the tuberculosis mortality rates for boys exceed those for girls. Both fall to a low level during the early school years. Then, between the ages of 10 and 14, the female rate exceeds the male. This excess continues through the 20- to 24-year age group. Then the male rate increases until it is three to four times greater than the female in the older age groups. The mortality rates were studied by decennia beginning with 1850. Originally, there was a marked fall in the male rates during early adult life, and no corresponding improvement in rates for the older groups. That came later. There has thus been a steady shift of the peak rate so that it is now in the 55- to 64-year age group. In women, at first there was a great fall in mortality rate for all age groups. Up to 1900, the changes were similar to those in men. Since then, there has not been a corresponding drop for young adult women, so that the highest mortality rate is in the 15- to 24-year age group. Thus, in men, the peak has shifted to the end of working life, but not so in women. There is a great discrepancy between the curves for attack rates and those of mortality rates. This discrepancy is resolved when use is made of the cohort method of analysis. By this means, it is shown that the high mortality in older men is the result of infection acquired much earlier in life. This does not occur in women because of the different nature of the disease in that sex. Young adult mortality represents acute mortality, which occurs in a greater proportion of female than male patients. In the latter, the disease tends to be more chronic, so that the mortality is spread over a longer period. This discrepancy between sexes is constant for all eras and all countries and suggests a fundamental biologic change associated with puberty. In the middle of the nineteenth century, the attack rate began to fall and then the mortality rate. This was the result of improvement in housing conditions, and came to an end toward the close of the century. Then the fall in attack rates for young adults ceased. Older groups still alive are showing the effects of this cessation of rate of decline. The gratifying fall in mortality in recent years is almost certainly due to chemotherapy.—*An interpretation of statistical trends in tuberculosis, V. H. Springett, Lancet, March 15 and 22, 1952, 1: 521 and 575.—(A. G. Cohen)*

Changing Nature of Tuberculosis.—To test an impression that the character of the pulmonary lesions has changed among patients admitted to a French tuberculosis sanatorium over the past twelve years, a survey was made. Only those patients without prior treatment were analyzed according to the following periods of admission: 1938 and 1939; 1941 and 1942; 1945 and 1946; 1949 and 1950. There had been a decrease in the more serious presenting symptoms, such as hemoptysis, in the last period and a marked increase in the number of patients admitted without symptoms. This corresponds in time with the development of case-finding programs. As to roentgenographic type and extent of disease, there was a striking increase in the percentage of localized, unilateral, infiltrative forms and a corresponding decrease in the more serious cavitary forms in the last period. This change followed immediately upon years of great deprivation and malnutrition. It is too great to be explained altogether by the number of

asymptomatic cases revealed by case-finding programs. The average time lapse between the onset of symptoms and admission has not changed, and there has not been a greater selectivity of cases. It is concluded that the disease is actually less grave than it was twelve years ago.—*Changements intervenus depuis douze ans dans les symptomes cliniques et radiologiques de début de la tuberculose pulmonaire, J. Vidal, J. Plane, T. Firatli, and O. Aydogan, Poumon, February, 1952, 8: 91.*—(*F. S. Lansdown*)

THE AMERICAN REVIEW OF TUBERCULOSIS

ABSTRACTS

Edited by LAWRENCE B. HOBSON

VOLUME 66 NOVEMBER, 1952 ABST. NO. 5

CLINICAL STUDIES, TUBERCULOSIS

Tuberculosis and Sickle-Cell Trait.—Of 150 tuberculous Negroes, 19 (12.6 per cent) had the sickling trait. Of 150 nontuberculous Negroes, 8 (5.3 per cent) had the trait. Exudative tuberculosis occurred in 74 per cent of tuberculous Negroes with the sickling trait, as compared with 38 per cent in those without the trait. Among 64 patients with exudative tuberculosis in the total series of 150 Negroes, 14 (22 per cent) had the sickling trait. In one patient with sickling trait, a pneumonectomy was performed. All vessels in the tuberculous tissue were packed with sickled red cells.—*Tuberculosis and the sickle-cell trait, W. Weiss & W. Stecher, A. M. A. Arch. Int. Med., June, 1952, 89: 914.—(G. C. Leiner)*

Tuberculous Tracheobronchitis.—In the last three and one-half years, January, 1946, to June, 1949, inclusive, 381 cases of pulmonary tuberculosis had been subjected to bronchoscopy in the teaching hospitals of the National Medical College of Shanghai (First Hospital of the Red Cross Society of China, Chung-Shan Memorial Hospital, Cheng-Chung Sanitorium). Of these, 90 patients (23.6 per cent) were found to have tuberculous tracheobronchitis; 54 were of congestive type, 22 were ulcerative, and 14 were fibrostenotic. Treatment consists of local medicinal as well as operative measures. Of the 20 patients treated locally, 8 were cured, 6 improved, 5 unimproved, and one became worse. Of the 28 patients treated with streptomycin, 6 were cured, 10 improved, 10 unimproved, and 2 became worse. Of the 4 treated with aerosol streptomycin, one was cured, one improved, one unimproved, and one became worse. Two were treated with *p*-aminosalicylate, with one improved and one unimproved. Seven patients were subjected to pneumonectomy, with 5 cured and 2 operative deaths. One patient was treated with lobectomy, with improvement. Two patients who underwent cavernostomy died. The presence of tuberculous tracheobronchitis is of great importance in the treatment of pulmonary tuberculosis. Collapse therapy, in general, should not be used.—*Tuberculous tracheobronchitis, S. Ying-heng & H. Chia-szu, Nat. Med. J. China, May, 1951, 37: 376; abstracted, Chinese M. J., July-August, 1951, 69: 366.—(L. Hyde)*

Classification of Treated Tuberculosis in Brazil.—After long trial, Brazilian authorities have abandoned use of the standards of the National Tuberculosis Association and the International Tuberculosis Union in evaluating results of treatment in tuberculosis cases. The therapeutic results is fundamentally a clinical problem and the conceptions of health must conform to clinical norms. As tuberculosis is a disease studded with outbursts or recrudescences, clinical cure means cure of the present episode according to clinical, roentgenographic, and bacteriologic standards. There may be a clinical cure even in the presence of viable bacilli in residual lesions. The main fault of the latest American classification is its omission of the term cure. The present Brazilian classification lists patients as: cured at present; probably cured at present; improved; arrested; worsened. These criteria are based on the principle that cure of the existing outburst or recrudescence may be a fact which should be accepted. This does not mean vouching for the sterility of residual lesions or discarding the possibility of future recurrences.

A cure, however, may be confirmed following a five-year observation period.—*Avaliação dos resultados do tratamento da tuberculose pulmonar, F. Poppe de Figueiredo, Rev. brasil. tuberc., September–October, 1951, 19: 581.*—(*A. A. Moll*)

Phrenic Paralysis and Artificial Pneumoperitoneum.—From a large series of pulmonary tuberculosis patients treated with phrenic paralysis or pneumoperitoneum, 20 were specially studied. The following conclusions are drawn: (*1*) The location of cavities, which must be clearly established, greatly influences the results. Maximum benefit is obtained when the cavities are in the dorsal segment of the lower lobes or the base of the posterior segment of the upper lobes. (*2*) The effect is directly related to the action on the drainage bronchus of the cavity. As a result of the bronchial obstruction caused by either phrenic paralysis or pneumoperitoneum, cavities either simply disappear or fill up. Segmental atelectasis may also develop. (*3*) For collapse therapy purposes, phrenic paralysis seems more effective than induced pneumoperitoneum. It is often advantageous, however, to use both. (*4*) Under such conditions as bilateral lesions or hemorrhages, pneumoperitoneum may be preferable to phrenic paralysis.—*Frênico-paralisia e pneumoperitôneo no tratamento das cavernas tuberculosas: Mecanismo de ação e importância da localização segmentar, J. F. Carneiro, Rev. brasil. tuberc., September–October, 1951, 19: 497.*—(*A. A. Moll*)

Extrapleural Thoracoplasty for Pulmonary Tuberculosis.—Of 100 patients who underwent extrapleural thoracoplasty for pulmonary tuberculosis in the First Hospital of the Red Cross Society of China and Chung-Shan Memorial Hospital from January, 1946, to December, 1949, inclusive, 6 had concomitant extrapulmonary tuberculosis. Although 66 patients had contralateral tuberculosis, only one of them required artificial pneumothorax at the time of thoracoplasty. The importance of careful selection of cases, preoperative preparation, and postoperative care is emphasized by the 24 cases of postoperative complications. In only one case of spreading tuberculosis, the succeeding stage of operation had to be postponed for a month. Of the 84 patients with follow-up records, 77 (91.7 per cent) were found to be benefited by the operative treatment. Of these, 51 patients (60.7 per cent) were apparently cured, 13 (15.5 per cent) arrested, 5 (6.0 per cent) apparently arrested, 4 (4.8 per cent) quiescent, and 4 (4.8 per cent) improved. Four cases showed no improvement. There were 3 late deaths. In one, the patient committed suicide one year after operation for reasons not related to his health. There was one operative death. The operative mortality was 1 per cent per patient and 0.4 per cent per operation.—*Extrapleural thoracoplasty for pulmonary tuberculosis, S. Ying-heng & H. Chia-szu, Nat. Med. J. China, May, 1951, 37: 376; abstracted, Chinese M. J., July–August, 1951, 69: 366.*—(*L. Hyde*)

Decortication.—Among 50 patients treated by decortication, there were 14 cases of nontuberculous empyema; 13 of these were cured and one, a two-month-old infant, died of hypothermia. In 4 of these cases, lobectomy for bronchiectasis was performed in addition to decortication. Among the 36 patients with tuberculous empyema, there were no postoperative deaths. Three patients developed chest wall infections from which they eventually died. In 31 of the 36 cases, the empyema was completely cured by decortication. In 4 cases, a thoracoplasty was also performed. Re-expansion of the lung was, contrary to expectation, followed by further regression of parenchymal lesions in most cases. Decortication is the present treatment of choice for empyema.—*Le traitement actuel des pleurésies purulentes chroniques, H. Métras, M. Warnery, M. Gregoire, A. Goupil, & J. Corolleur, Presse méd., November 21, 1951, 59: 1554.*—(*V. Leites*)

CLINICAL STUDIES, NONTUBERCULOUS DISEASES

Mycobacterium Ulcerans.—*Mycobacterium ulcerans* has been isolated from various parts of the world in the past ten years from chronic ulcers of the skin in man. It is characterized by its failure to grow on the usual media used for cultivating tubercle bacilli when the cultures are incubated at 37°C. or room temperature but by its slow growth on these media at 33°C, by its lack of pathogenicity for rabbits and guinea pigs, and by the cutaneous lesions it causes in rats and mice. Serologic studies by means of complement fixation using absorbed and unabsorbed serum have indicated that the microorganism is antigenically distinct from other species of *Mycobacteria* although more closely related to mammalian tubercle bacilli than to others. A two and one-half-year-old child without signs of tuberculosis, as well as some other patients, from whom *Mycobacterium ulcerans* had been isolated, gave positive skin reactions to OT. In order to assess the significance of this finding, investigations were set up to determine cross reactivity of several strains in the skin of guinea pigs. Animals were sensitized by injections of *Mycobacteria ulcerans, avium, phlei, paratuberculosis,* and *ranae* and BCG grown on egg slants. They were later skin tested with BCG, mammalian PPD, avium PPD, *Mycobacteria avium, ranae, phlei, paratuberculosis,* and *ulcerans* grown on Tween-albumin medium. The accumulated results show much cross reactivity. In every case the most striking results were with the homologous antigens. Animals sensitized with *Mycobacterium ulcerans* showed strong reactivity to suspensions of the homologous organism and some cross reactivity with other *Mycobacteria,* especially mammalian tubercle bacilli and PPD. This suggests that in a man, also, a positive Mantoux test may indicate infection with *Mycobacterium ulcerans* rather than *Mycobacterium tuberculosis.*—*Studies on Mycobacterium ulcerans: II. Cross-reactivity in guinea-pigs sensitized with Mycobacterium ulcerans and other Mycobacteria, F. Fenner, Australian J. Exper. Biol. & M. Sc., February, 1952, 30: 11.*—(*S. Hadley*)

Experimental Leprosy.—Three strains of acid-fast bacilli have been isolated from lepers and grown in culture. Each of 30 lepers was inoculated intradermally with each of these strains as well as with Leprolin, a "killed antigen." On the tenth day after inoculation, 24 patients had severe generalized reactions and 2 had moderately severe reactions. Of the 30 cases, 16 had leprotic reactions, 10 being lepromatous and 6 inactive. One strain of bacilli (Chaves II) produced local ulceration in every patient; another (Emilia), in all but one. The third strain (Hecke) produced only mild reactions in 23, while ulceration appeared in 10 patients at the site of the Leprolin injection. Chromogenic bacteria were cultured on the tenth day from 19 of 20 lesions and on the eighteenth day from 15 of 30 lesions. These cultures morphologically resembled those inoculated. Thus, it seems that these three strains can evoke the Koch phenomenon in lepers.—*Trials with experimental leprosy (Portuguese), H. C. de Sonza-Araujo & J. Gomes de Sa, Mem. Inst. Oswaldo Cruz, 1951, 49: 659.*—(*L. B. Hobson*)

Tuberculin Positivity in Lepers.—Among 1,019 leprosy patients at the Curupaití Asylum in Brazil, 119 (11.7 per cent) cases of pulmonary tuberculosis have been found during the three-year period of July, 1948, to July, 1951. In all these cases, the disease developed some time after a diagnosis of leprosy had been made. Of 54 patients, 13 with the tuberculoid and 41 with the lepromatous type of leprosy, 42 (77.8 per cent) proved tuberculin-positive. Positivity was higher among lepromatous (80 per cent) than among tuberculoid (69.2 per cent) cases. Erythema nodosum followed the testing in 21 of the 54 patients. One of them was tuberculin-negative. This complication was finally controlled with penicillin after other therapeutic measures failed.—*Cutirreação à tuberculina em doentes de lepra, S. de Oliveira*

Lima & M. Fontes Magarão, Clín. tisiol., January-February, 1952, 7: 65.—(A. A. Moll)

Sarcoidosis with Jaundice.—An unusual case of sarcoidosis with marked hepatosplenomegaly and jaundice unaccompanied by characteristic organ involvement demonstrated the difficulties in diagnosis and the value of liver biopsy. Because of their characteristic widespread dissemination, chronicity, and unequal concentration in the various organs, the lesions of sarcoidosis can produce a variety of clinical syndromes. In the order of frequency, these lesions have a predilection for the lymph nodes, lungs, skin, and bones, and splenomegaly is not infrequently seen in association with the lymphadenopathy. In the current case, roentgenograms of the chest, hands, feet, and nose were normal. An inguinal node contained sarcoid tubercles and confirmed the findings in the liver and spleen. It was not enlarged, and other lymph nodes may also have contained lesions. Liver function tests indicated both obstructive and hepatocellular disease. Hepatocellular damage was evidenced by a strongly positive cephalin flocculation test, elevated thymol turbidity values, and progressive decline in the esterified cholesterol fraction from 73 per cent to 30 per cent. Steadily increasing total cholesterol concentrations, markedly elevated alkaline phosphatase, low values for the indirect-reacting bilirubin in comparison with high values for the direct-reacting type, bile and urobilinogen in the urine, with, on occasion, absence of urobilinogen from the stools suggested an obstructive lesion. The relatively unaffected serum albumin, an unusual finding in liver disease, confused the issue. This clinical picture seemed to represent a chronic hepatitis or a biliary type of cirrhosis, but a biopsy established the correct diagnosis.—*Sarcoidosis with marked hepatosplenomegaly and jaundice: A case report with biopsy findings, A. E. Dagradi, N. Sollod, & J. H. Friedlander, Ann. Int. Med., May, 1952, 36: 1317.—(T. H. Noehren)*

Childhood Pneumonia and Bronchopulmonary Disease.—It is generally believed that childhood pneumonia, once a serious illness, no longer presents a major pediatric problem. Current antibacterial treatment, however, may not prevent chronic bronchopulmonary disease, and more vigorous measures may be necessary. Survey studies indicate that recurrences of respiratory infections are frequent, even when antibiotics have been given. This recurrent respiratory sickness often leads to suppurative bronchopulmonary disease, and bronchiectasis represents approximately 5 per cent of all diseases in childhood. The history of children with bronchopulmonary disease was studied to determine to what extent pneumonia treated with antibacterial agents was an etiologic factor. Of 176 children with a history of frequent and prolonged respiratory illness, more than half had been affected by pneumonia. In most cases, clinical and roentgenologic findings indicated advanced bronchopulmonary infection. Bronchographic studies in 18 children revealed definite bronchiectasis in 7 and doubtful bronchiectasis in 8. Most of these children had been treated with sulfonamides, penicillin, aureomycin, or chloramphenicol for pneumonia or severe respiratory illness. Apparently modern therapy did not prevent the development of chronic pulmonary disease, perhaps because pneumonia was not completely cured. Of 224 children consecutively hospitalized for primary pneumonia between 1946 and 1950, the majority were treated with antibiotics and/or sulfonamides for one to seven days. At the time of discharge from the hospital, 26.8 per cent of the whole group still had signs of incompletely resolved pneumonia. Roentgenographic re-examination of 48 children revealed residual pathology in approximately one-half of them. Of the 224 children, 22.9 per cent returned to the outpatient department within these four years because of recurrent and persistent respiratory illnesses. An additional 12.1 per cent had to be rehospitalized, the majority for subsequent attacks of pneu-

monia. Delayed or incomplete resolution usually indicates nonpneumococcic suppuration with bronchial obstruction and atelectasis. Pneumonia which does not resolve promptly should be treated until all evidence of residual pathology has disappeared. Since minor upper respiratory infections may be precursors of more severe conditions, prolonged and adequate therapy is recommended prophylactically. The majority of the 176 children affected by bronchopulmonary disease gave a history of onset before the age of two years. This "susceptibility" to respiratory sickness in young children suggests intrafamilial rather than extrafamilial contacts as sources of infection. The respiratory health of a person may depend chiefly on freedom or protection from chronic respiratory disease in his own family during his early childhood. By detecting familial contacts, mitigating their communicability, and giving particular attention to exposed children, respiratory disease may cease to be a major pediatric problem.—*Childhood pneumonia, a common cause of bronchopulmonary disease, W. Finke, A. M. A. Am. J. Dis. Child., June, 1952, 83: 755.*—(*M. J. Small*)

PIE Syndrome.—Recently, unsuspected nondescript pulmonary infiltrations have focused attention on Löffler's syndrome, tropical eosinophilia, and related conditions. Löffler emphasized variable, migrating pulmonary infiltrations and peripheral eosinophilia with a benign clinical course of brief duration Tropical eosinophilia, described as a separate entity, is more severe and prolonged. The onset may be with anorexia, malaise, and a fever of 100° to 101°F. A dry, hacking cough is common. Wheezing and expiratory dyspnea and splenomegaly may occur. There is a uniformly distributed, extensive mottling with small, nodular shadows in both lungs, and linear markings are increased. Löffler's syndrome and tropical eosinophilia are similar and may be related to other diseases suspected of having an allergic origin. The original concepts of definable entities are changing as more protean cases are encountered with only pulmonary infiltration and blood eosinophilia in common. Specific names, such as Löffler's syndrome or tropical eosinophilia, seem obsolete. "Pulmonary infiltration with eosinophilia" (PIE syndrome) is descriptive and, accompanied by a primary, subsidiary, or modifying diagnosis, is clear. An accompanying disease of known or suspected allergic origin, especially bronchial asthma, angioneurotic edema, hay fever, eczema, migraine headache, serum sickness, rheumatic fever, rheumatoid arthritis, and collagen-vascular diseases, should always be sought. The differential diagnosis should include eosinophilic leukemia, Hodgkin's disease, periarteritis nodosa, which is sometimes an accompanying diagnosis, pulmonary tuberculosis, fat embolism, infectious mononucleosis, septicemia and pneumonia of rheumatic, bronchial, lobar, aspiration, or viral type. Eight cases of the PIE syndrome and various accompanying conditions were seen in eighteen months. Of the 4 patients described, 2 had no accompanying severe, progressive disease; one had a more severe illness with albuminuria, casts, hematuria, and altered plasma proteins, and a progression downward arrested by corticotropin. Arsenicals seemed to maintain a remission begun after the first injection. In the fourth case, progressive periarteritis nodosa accompanied the PIE syndrome. Pulmonary infiltration present prior to hormone therapy cleared before the patient died.—*Pulmonary infiltration with eosinophilia (PIE syndrome), W. H. Reeder & B. E. Goodrich, Ann. Int. Med., May, 1952, 36: 1217.*—(*T. H. Noehren*)

Rare Pulmonary Anomaly.—A rare anomaly was discovered during an operation for suppurative disease of the right lung base in a young man with dextrocardia, sinusitis, and infantalism. On entering the free pleural space, only one lobe was encountered, but the right hemidiaphragm appeared to be unusually high and palpation over its surface revealed crepitation. After re-expansion

under anesthesia, the lower lobe was discovered to be extrapleural, flattened against the diaphragm, and entirely covered with parietal pleura. A large vein ran from the posterior segment of the upper lobe to the corresponding segment of the lower lobe. The lobe was dissected off the diaphragm, to which it was closely adherent, and the pulmonary vein was found to arise from its under surface instead of at the hilum; it traversed the diaphragm and entered the suprahepatic portion of the inferior vena cava.—*Malformation pulmonaire rare: Lobe extrapleural associé à une anomalie veineuse, A. Campo, Poumon, March, 1952, 8: 251.*—(*F. S. Lansdown*)

Bilharzial Cor Pulmonale.—Pulmonary heart disease due to *Bilharzia* is not uncommon in hospital practice in Egypt. It develops as a sequence of repeated pulmonary embolism with the *Schistosoma haematobium* or *mansoni* ova. The ova are impacted in the arterioles accompanying the respiratory bronchioles. From there they escape through the vessel wall into the lung parenchyma where a bilharzial tubercle is formed. An obliterative arteriolitis is produced, resulting in obstruction to the pulmonary blood flow and the production of pulmonary hypertension. Twenty patients with pulmonary heart disease due to *Bilharzia* were seen among 500 cardiac patients. The age incidence was between 12 and 40 years; there were 4 males to every one female. The symptoms and signs were those of cor pulmonale.—*Pulmonary heart disease due to Bilharzia: The bilharzial cor pulmonale; a study of twenty cases, B. Girgis, Am. Heart J., April, 1952, 43: 606.*—(*G. C. Leiner*)

Valvotomy for Mitral Stenosis.—Among 100 patients treated by valvotomy for mitral stenosis, 13 deaths occurred; 7 of these were among the first 20, one in the next 30, and 5 in the final 50 patients operated upon, so that for the last 80 patients the operative mortality has been less than 8 per cent. The presence of auricular fibrillation added to the risk; 8 deaths occurred in 44 patients with this complication as compared with 5 deaths among 56 patients who were not fibrillators. Among the first 8 deaths, 3 were due to cerebral embolism and 5 to circulatory failure. The absolute contraindications to the operative procedure are recognizable rheumatic activity, severe disease of the aortic valve, severe mitral incompetence, severe tricuspid stenosis, and a patient who is too old, perhaps older than 55 years. Irreversible pulmonary hypertension and an irretrievably damaged cardiac muscle are clinically unrecognizable contraindications. Unfavorable features, but not contraindications, include a large heart, moderate aortic valve disease, some degree of mitral incompetence, auricular fibrillation, congestive heart failure, a history of embolism, and considerable pulmonary hypertension. Eighty per cent of the patients operated on were between 25 and 45 years old. Among the first 50 cases who were operated upon prior to May, 1951, the results were good or excellent in 32. The various manifestations of pulmonary congestion provided the best results. Mitral regurgitation was not increased by a successful operation, and the clinical recognition of a predominating mitral insufficiency was not always easy. In 5 cases, marked regurgitation was found where mitral incompetence had not been diagnosed preoperatively. A history of previous embolism was no argument against valvotomy. No thrombosis was found in the auricle at operation in 8 of 17 such patients; a thrombus was present in 21 cases with no past history of embolism. Cardiac catheterization was carried out in all cases, and the findings rarely changed clinical views. Most patients submitted for operation had a resting pulmonary capillary pressure of 20 to 30 mm. of mercury and a mean pulmonary artery pressure of 30 to 50 mm. of mercury. No cases were observed in which pulmonary hypertension proved irreversible following valvotomy. Three operations were carried out during pregnancy with good results, and premature termination of pregnancy was thereby avoided. The valve was split along

one or both commissures with the index finger inserted through the left auricular appendage. A valvotome was used in only 28 instances, and its use routinely is believed to be potentially dangerous. Following operation the maximum fall in pulmonary artery pressure sometimes occurred as long as sixteen months following operation. The improvement of subjective symptoms was the most reliable indication of a successful result. Diminution in the signs of pulmonary hypertension was of some value. In a few patients the diastolic murmur entirely disappeared; in many the intensity was diminished. The longest period of follow-up in the first 50 cases has been forty months, and although a more prolonged follow-up is needed, there is as yet no evidence of relapse, either from further stenosis of the valve or from further rheumatic activity. Since the operation is on a valve rather than a valvule, it is suggested that the term valvotomy replace the term valvulotomy now in common usage.—*Valvotomy for mitral stenosis: A further report on 100 cases, C. Baker, R. C. Brock, M. Campbell, & P. Wood, Brit. M. J., May 17, 1952, No. 4707:1043.—(E. A. Riley)*

Commissurotomy for Mitral Stenosis.—Review of 30 cases of commissurotomy for mitral stenosis, all studied by ballistocardiography and cardiac catheterization preoperatively, indicates that the ideal candidate for the operation is between 20 and 35 years of age, with sinus rhythm, presenting exertional dyspnea or episodes of pulmonary edema, with demonstrable pulmonary hypertension on catheterization and a small mitral orifice. Contraindications were recent rheumatic fever, congestive heart failure, and pulmonary arteritis. The operation was performed according to the technique of O'Neill, Bailey, and Glover. The immediate postoperative course was generally uneventful save for slight pleural effusion and transient arrhythmias. The late results were as follows: (*1*) Two patients died. One of these was a man who had threatened suicide if the operation were not attempted despite serious contraindications. The other died in pulmonary edema, although commissurotomy had been easy. (*2*) The 28 others were all benefited functionally. One of these had too small an auricle to allow an adequate commissurotomy. Those patients followed longest (fifteen months) have been able to resume work. Hemodynamic studies have demonstrated that the drop in right heart pressure is not immediate. For example, the first patient had a preoperative pulmonary artery pressure of 60 systolic and 40 diastolic. Two months later it was 45 systolic and 20 diastolic, and nine months later was normal.—*Trente commissurotomies pour rétrécissement mitral, Mme. Servelle, P. Soulié, J. Rougeulle, J. Carlotti, F. Joly, G. Vocci, & G. Delahaye, Poumon, March, 1952, 8: 257.—(F. S. Lansdown)*

Commissurotomy for Mitral Stenosis.—During 24 commissurotomies performed for mitral stenosis according to the technique of Brock and Harken, no clots were found in the auricular appendage. In a number of instances the walls were approximated by adhesions which had to be severed before the finger could be fully introduced. Three general types of valves were encountered at operation: (*1*) a tight stenosis, calcified or not, but with preservation of the suppleness of the valves and without any involvement of the chordae tendineae; (*2*) funnel stenosis, in which the valves are rigid and cone-shaped, drawn into the ventricular cavity by the papillary muscles which insert directly onto the valves without interposition of the chordae tendineae; and (*3*) moderate stenosis, admitting the fingertip, bounded by a rigid ring but maintaining supple valves. The respective advantages and disadvantages of finger *versus* instrumental fracture of the valve differ in these three categories. In the first type the tight valve can usually be fractured with the finger; since the remainder of the valve and the chordae tendineae are supple, the function may return to nearly normal and the opening may be increased four to six times. It is in this type of valve that the greatest successes are encountered. In the

second group it is impossible to do a finger commissurotomy, and an instrumental one cannot re-establish the function of the valve because of the rigidity of the entire structure. This type fortunately represents only 3 to 5 per cent of cases. The third variety constitutes approximately 15 per cent of cases. As the ring is elastic it cannot be broken with the finger, but after instrumental fracture the outlook for satisfactory function is good. Of the 24 patients subjected to operation, there were 4 deaths. Three patients have been operated upon too recently to evaluate. Of the remaining 17, there are 12 good or very good results and 3 moderate improvements. Although there is usually auscultatory improvement, the murmur rarely disappears altogether. Contraindications to operation were considered to be: rheumatic fever, active carditis, important degree of mitral regurgitation, and right heart failure. The best patients are those with an edematous mitral narrowing, a small heart, without right failure, in regular sinus rhythm, and presenting themselves because of permanent dyspnea, crises of pulmonary edema, or hemoptysis.—*Résultats de 24 commissurotomies pour sténose mitrale, F. d'Allaines & C. Dubost, Poumon, March, 1952, 8: 265.—(F. S. Lansdown)*

Aneurysm of Pulmonary Artery.—Aneurysms are rare in the pulmonary artery and only 15 per cent of them develop in its peripheral branches. Shunt occurs only in the congenital variety, in the form of an arteriovenous fistula which is frequently associated with other vascular anomalies, particularly with Osler's "familial hemorrhagic telangiectasis." This latter condition was present in several members of the family of a woman who showed a round focus in the right lower lung field in addition to marked telangiectatic changes over her skin and mucous membranes. Clinically, she had profuse bleeding from the gastrointestinal tract and secondary anemia. A systolic murmur was heard over the area of the chest corresponding to the shadow, but no pulsations were observed on fluoroscopic examination. The vascular origin of this shadow and its connection with the hilum were confirmed by tomographic examination. Because of the danger of rupture, surgical removal is recommended in these cases. Acquired aneurysm is extremely rare in the branches of the pulmonary artery, and the underlying disease, ulcerative endocarditis or rheumatic infection, usually overshadows the signs and symptoms determined by this condition. In 2 cases the diagnosis of aneurysm was confirmed by kymographic examination, showing pulsations of branches of the pulmonary artery.—*Ueber kongenitale und erworbene periphere Aneurysmen der Arteria pulmonalis, H. Schludermann, Fortschr. a. d. Geb. d. Röntgenstrahl., January, 1952, 76: 8.—(L. Molnar)*

Angiocardiography.—A series of 60 patients with bronchogenic carcinoma were studied by angiocardiography. For early diagnosis, this method was inferior to other methods, such as tomography, bronchography, and cytologic sputum studies. It was valuable, however, in determining the prognosis and operability. Benign tumors produced compression or displacement of vessels: malignant tumors caused distortion associated with narrowing of the arteries, progressing toward obstruction and complete amputation of the branches or the pulmonary artery itself. In the undifferentiated cell tumors the vessels may have been more extensively and more rapidly invaded than in the squamous cell type. In most cases, arterial obstruction corresponded exactly to the site of bronchial stenosis visualized by bronchoscopy. When there was involvement of the pulmonary artery, the exact site of "amputation" on the angiocardiogram was determined to evaluate the possibility of ligation during pneumonectomy. Involvement of the vena cava superior and its branches was an indication of inoperability. When investigating the superior vena cava, it was inadvisable to inject serum after the contrast medium; this produced dilatation of the vein, which might obscure early evidence of venous stasis. Various degrees of narrowing and filling defects were

observed in the superior vena cava associated with reflux of the contrast material into the jugular, subclavian, and brachio-cephalic veins.—*Étude angiopneumographique de 60 cas de cancer bronchique, diagnostic, operabilité, A. G. Weiss & J. Witz, Semaine d. hôp. Paris, December, 1951, 27: 3834.*—(*V. Leites*)

Kymography of Pulmonary Vessels.—The pulsations of the pulmonary vessels were studied kymographically in relation to the cardiac action, the elasticity of the lung, and the status of the vessels themselves. The pulsations most commonly recorded were those transmitted from the heart, and their character was determined by the amplitude and the rapidity of the cardiac action. They were more pronounced with impaired elasticity of the lung such as occurs in silicosis and emphysema. Their intensity was reduced with infiltrations, pleural adhesions, and detension of the lung. Besides these transmitted pulsations, designated as "locomotion," the pulmonary vessels sometimes showed kymographic excursions due to an increased pressure in the pulmonary circulation when this was associated with an increased volume of circulating blood and with distension of the vessels. This type of pulsation, called "distension," was demonstrated kymographically only in cases of congenital heart conditions in which these 3 factors were present. Present kymographic technique is inadequate to reveal the increase of the pulmonary pressure alone, as it occurs in mitral stenosis, emphysema, and silicosis.—*Zur Frage der Bewegung der Lungengefässe im Herzkymogram, R. Haubrich, Fortschr. a. d. Geb. d. Röntgenstrahl., January, 1952, 76: 1.*—(*L. Molnar*)

Lymph Node Aspiration.—Lymph node aspiration has become an important adjunct to the study of lymphadenopathies. The only apparatus required is a 20-gauge needle and a dry syringe. A smear of the aspirate is made for staining with Wright's stain. This method has provided the means for correct diagnosis most often in Hodgkin's disease, lymphosarcoma, lymphadenitis, and metastatic cancer. Concomitant study of peripheral blood was found better for the diagnosis of lymphatic leukemia and infectious mononucleosis. The method is also useful for determining tuberculosis in a node. It is believed that lymph node aspiration may replace, or at least supplement, surgical biopsy in the hematologic study of the lymphadenopathies.—*Lymph node aspiration, M. Morrison, A. A. Samwick, J. Rubinstein, M. Stich, & L. Loewe, Am. J. Clin. Path., March, 1952, 22: 255.*—(*J. S. Woolley*)

Carcinoma of the Esophagus.—Among 159 patients with carcinoma of the esophagus, 72 per cent were men. The average age of the men was 63 years and of the women, 64; the youngest patient was aged 22 years. Of the patients, 60 per cent had symptoms for three months or less before admission. Of the carcinomas, 60 per cent were situated in the lower third of the esophagus, 28 per cent in the middle third, and 12 per cent in the upper third. Dysphagia was the most common first symptom, noted initially by 87 per cent of the patients. The three most common symptoms were dysphagia, weight loss, and regurgitation followed by pain and a sensation of obstruction in the esophagus. In 7 patients, barium studies did not reveal the correct diagnosis. Esophogoscopy was positive in all cases; in no instance did accidental perforation of the esophagus occur. The stools of all patients were examined for occult blood, but it was found in only 18. Operative procedures varied with the site of the carcinoma. Growths of the lower end involving the cardia were removed by block dissection of stomach, spleen, omentum, and tail of the pancreas through a thoraco-abdominal approach with an esophago-jejunostomy. If the cardia were not involved, the stomach and esophagus were joined below the aortic arch. For lesions of the upper third, palliative therapy was often the only possible procedure. Pathologically, 77 of the carcinomas were squamous, 16 were undifferentiated squamous carcinomas or anaplastic growths,

and 9 were adenocarcinomas. Pulmonary complications were the most common causes of the 14 postoperative deaths. Among the 5 survivors, one has been alive for four years, 2 for two years, and 2 for eighteen months.—*Carcinoma of the esophagus, the diagnosis and surgical treatment of 159 cases, R. H. Franklin & J. J. Shipman, Brit. M. J., May 3, 1952, No. 4765:947.—(E. A. Riley)*

Cytologic Sputum Examination.—Sputum and secretions obtained at bronchoscopy were examined for 154 patients with various pulmonary conditions. There were 35 cases of histologically proved carcinoma of the lung in which the Papanicolau method yielded positive results in 22 (63 per cent). An additional 10 positive results were encountered among 15 cases of very probable, but not histologically proved, carcinoma of the lung. There were no false positive results among the remaining cases.—*La recherche des cellules neoplasiques dans l'expectoration au cours des cancers bronchiques, H. Brocard & G. H. Lavergne, Presse méd., May, 1952, 60: 730.—(V. Leites)*

ANTIMICROBIAL THERAPY

Laboratory Studies of Isoniazid.—Isoniazid, or isonicotinic acid hydrazide (Neoteben), and related compounds were found to have marked antimicrobial properties against *M. tuberculosis in vitro* and in experimental infection. *In vitro*, isoniazid was much more active than *p*-aminosalicylic acid (PAS), and its tuberculostatic activity was 10 times greater than that of the most active thiosemicarbazones; it inhibited growth of tubercle bacilli in a dilution of 1:10,000,000. A series of comparative studies showed that isoniazid was more effective in experimental tuberculosis than PAS, streptomycin, or amithiozone. In guinea pigs infected with human-type tubercle bacilli, the suppressive effect of 10, 25, and 50 mg. of isoniazid per kg. was greater than that of PAS in doses of 100 and 250 mg. per kg. Similar results were obtained in rabbits infected with the bovine type of tubercle bacilli. The serum of individuals to whom 500 mg. of isoniazid had been administered inhibited the growth of *M. tuberculosis* on solid media in a dilution of 1:10. Isoniazid could be administered orally and parenterally in doses of 1 to 15 mg. per kg. a day. Smaller doses should be used at the start and increased gradually, using the maximum doses only for short periods. Combinations of various other antituberculous drugs lengthen the effectiveness of chemotherapy, and it is fair to assume that isoniazid, alone or together with other drugs, represents an important step forward in tuberculosis control. A better understanding of the experimental basis of chemotherapy is essential for further progress. The extensive liver function studies and other laboratory investigations carried out in connection with amithiozone therapy have created the impression that this drug is more toxic than other antituberculous drugs. There is experimental evidence, however, that large numbers of dead tubercle bacilli injected into guinea pigs and rabbits may provoke a fatty degeneration of the liver. The destruction of many bacilli in the human body may produce the same phenomenon. Since the tuberculostatic activity of amithiozone is more pronounced than that of streptomycin and PAS, it is understandable that the former drug, destroying larger numbers of bacilli, may result in more pronounced toxic phenomena. It is therefore advisable to start with small doses and to increase the dosage gradually, using the higher doses only for a short time. Another phenomenon noted in connection with amithiozone therapy is a sharp drop in the erythrocyte sedimentation rate instead of a gradual decrease of it. It is thought that this is due to a marked reduction of the α-globulin, while there is a less pronounced reduction of the β-globulin and the γ-globulin remains unchanged. The electrophoretic study of the serum proteins may be used as a guide in the dosage of amithiozone: in the presence of a sharp reduction of the α-globulin fraction, the amithiozone should be temporarily suspended, or at least its dose diminished.—*Ein weiterer Beitrag*

zur experimentallen Chemotherapie der Tuberkulose (Neoteben), G. Domagk, H. A. Offe, & W. Siefken, Deutsche med. Wchnschr., May 2, 1952, No. 18:573.—(L. Molnar)

Clinical Trials of Isoniazid.—The pharmacologic properties and the side effects of isoniazid (Neoteben) were studied in 126 patients with moderately advanced, long-standing cavitary tuberculosis. Isoniazid is an easily soluble and readily absorbed compound and was well tolerated by the patients. The optimal daily dose was found to be 10 to 15 mg. per kg. of body weight. Adults weighing 50 to 60 kg. received 900 mg. of isoniazid a day, divided in four doses given after the meals. For parenteral and intrapleural use, a 2 per cent solution was prepared and was well tolerated. Intrathecally, 1.0 to 2.5 cc. of the 2 per cent solution was administered without untoward effects. It was impossible to determine quantitatively the isoniazid content of the plasma. The biological method used consisted in testing the growth-inhibiting activity of samples of serum. Serum from patients who received a single dose of 800 mg. of isoniazid inhibited growth in cultures of tubercle bacilli in a 1:5 dilution at least twelve hours after the dose and in a 1:10 dilution six hours after the medication. Except for a mild skin eruption, no important side effects were observed. There was no evidence of toxicity for the liver, kidney, or blood-forming organs. A few patients complained of paresthesias and of dizziness. Of the 126 patients treated with isoniazid over a period of a little more than six months, only 61 were suitable for the assessment of the therapeutic value of the drug, obviously limited to the immediate effect of the treatment. No clinical or roentgenologic impairment was noted in any of the cases during treatment. More than two-thirds of these patients showed a rapid improvement, characterized by increase of appetite and marked gain in weight. Of 45 patients who had fever on admission, 32 became afebrile rapidly; and among 58 patients with sputum positive for tubercle bacilli, 15 conversions were observed. Of 40 cases with definite cavitation, cavity closure occurred in 4 instances; in 18 cases there was considerable reduction in the size of the cavities. There was marked roentgenologic clearing in 14 cases, while the roentgenographic appearance of the lesions remained unchanged in 17 cases.—*Die Behandlung der Tuberkulose mit Neoteben (Isonikotinsäurehydrazid) Dosierung, Anwendungs form und erste klinische Ergebnisse, P. Klee, Deutsche med. Wchnschr., May 2, 1952, No. 18:578.—(L. Molnar)*

Isoniazid in Renal Tuberculosis.—A group of 9 patients with renal tuberculosis were treated with isoniazid in daily doses of 250 mg. for three or four weeks. In all cases, the urine remained purulent and positive for acid-fast bacilli, with no reduction in the bacillary content. In 2 cases, subsequent treatment with streptomycin and *p*-aminosalicylic acid rendered the urine negative for tubercle bacilli within three days. In 2 other cases, this result was achieved with streptomycin, *p*-aminosalicylic acid, and amithiozone after ten days.—*Sur l'action de l'hydrazine de l'acide isonicotinique dans le traitement de la tuberculose rénale, R. Couvelaire, J. R. Debray, & A. Desmonts-Gros-Decau, Presse méd., June, 1952, 60: 881.—(V. Leites)*

Isoniazid.—Isoniazid was effective *in vitro* at concentrations of 0.05γ per ml. against tubercle bacilli, even those already resistant to *p*-aminosalicylic acid (PAS), streptomycin, or amithiozone. There was no evidence of a combined action greater than an additive one with PAS and streptomycin; there was an *in vitro* action greater than additive with amithiozone. After a single dose of 500 mg., 60 per cent was excreted in the urine within twenty-four to thirty hours. That excreted in the first twelve hours was unaltered isoniazid; thereafter, that excreted was in part degraded and in part conjugated. Clinically, placebos were used to test the subjective effects of medication, and patients so treated did not respond with increased appetites or weight gain. In all, 131 patients with pulmonary

tuberculosis received 5 to 10 mg. of isoniazid per kg. of body weight for three months. Of these patients, 70 per cent gained weight, averaging one pound a week; 20 per cent maintained their weight; and 10 per cent lost weight. The sputum was decreased in amount, at least transiently, and became more fluid. Bacilli disappeared from the sputum of many patients but reappeared on continued treatment in most of them. Fever sometimes fell slowly or rapidly, and the erythrocyte sedimentation rate fell before rising again to normal values. Roentgenograms showed little change in the brief period. More indicative of the drug's effect were the results in 5 cases of tuberculous meningitis, 2 with simultaneous miliary tuberculosis. Of these, 4 were treated with isoniazid alone in doses of 1,000 mg. orally and 25 mg. intrathecally each day. All abnormal findings regressed within three to six weeks, and the miliary lesions in one patient responded promptly. The fifth patient was gravely ill with miliary-meningeal disease and received isoniazid with streptomycin and PAS. After defervescence, the further course was unsatisfactory. Two additional meningitis patients who were failing despite the usual treatment improved with isoniazid. Toxicity was evidenced by excitability, palpitation, paraesthesias with evident polyneuritis in 2 cases and motor weakness in another. One patient became schizophrenic during therapy. Conjunctival injection, exanthemata, and 3 cases of erythema appeared. Drug fever occurred four times. Hemoptysis was noted twice, and in several cases the menses were heavy and prolonged. Single doses of 100 to 150 mg. caused anorexia and nausea.—*Vorläufiger Bericht über Isonikotinsäurehydrazid (Rimifon, Neoteben) auf Grund experimenteller und klinischer Untersuchungen, L. Heilmeyer, W. Schaich, G. Buchegger, H. Kilchling, F. Schmidt, & A. M. Walter, München. med. Wchnschr., June 27, 1952, 94: 1303.*—(*L. B. Hobson*)

Isoniazid for Skin Tuberculosis.—A series of 20 patients, chiefly with lupus vulgaris but also with tuberculosis cutis verrucosa, tuberculosis colliquativa, and papulo-necrotic tuberculids, has been treated since November, 1951, with 5 to 10 mg. of isoniazid per kg. of body weight. Most of the patients previously had received amithiozone and massive doses of vitamin D and had relapsed. Isoniazid produced rapid and pronounced regression with minimal evidence of toxicity.—*Vorläufiger Bericht über die Wirkung des Neoteben (Isonikotinsäurehydrazid) auf die Hauttuberkulose, O. Grutz, München. med. Wchnschr., June 27, 1952, 94: 1297.*—(*L. B. Hobson*)

Late Results in Miliary Tuberculosis.—At the Clinique de la Tuberculose de Paris, 114 adult patients were treated with streptomycin for miliary pulmonary tuberculosis between January, 1947, and March, 1948. In January, 1951, 53 of these were dead, 54 alive, and 7 could not be traced. Of the 53 who died, 37 (70 per cent) succumbed within the first year to tuberculous meningitis; 5 died during the first few days of treatment with signs of asphyxiation, 3 had fatal relapses, 5 died of other tuberculous lesions, and 3 died of undetermined reasons. In all, 70 per cent of the 53 died within less than six months after starting therapy; another 21 per cent died within seven to twelve months. Of the 54 known survivors, 10 had tuberculous meningitis during the first six months after therapy and recovered; 4 had recurrent miliary pulmonary lesions but lived. In addition, 14 patients have at some time had osteoarticular tuberculosis, 9 have had genitourinary tuberculosis, and 12 have had active pulmonary disease. The remaining 5 patients have had other forms of tuberculosis. Of the 54, however, 38 apparently had been cured of all tuberculosis at the time of review. In regard to the prediction of death, it is of interest that the mortality rates between the ages of 15 and 24 years were 45 per cent for men and 38 per cent for women; over the age of 25, the rates were, respectively, 65 and 44 per cent. The risk of meningitis was not influenced by age, but was 45 per cent for men and 32 per cent for women; 83 per cent of the patients died when meningitis was present at

the start of therapy and 90 per cent when it appeared later. If tubercles could be seen in the optic fundus, 59 per cent of the patients died; if not, 31 per cent died. Of the febrile patients, 57 per cent died, and of the afebrile patients only 16 per cent died. When the chest roentgenogram showed typical miliary lesions, 49 per cent died; when atypical lesions were found, 30 per cent died. If the tuberculin test was positive before therapy, 63 per cent of the patients survived; if it was negative, 48 per cent lived.—*L'avenir des tuberculoses pulmonaires miliaires traitées par la streptomycine, E. Bernard, B. Kreis, A. Lotte, & M. G. Bergot, Bull. et mém. Soc. méd. d. hôp. de Paris, 1951, Nos. 23 & 24: 881.*—(*L. B. Hobson*).

Late Results in Tuberculous Meningitis.—The long-term results of the first 100 patients treated with streptomycin for tuberculous meningitis at the Clinique de la Tuberculose de Paris were reviewed in March, 1951. Treatment was begun in 1947 or 1948 in each case. Of the 100, 20 were living and well, 7 for more than four years and 13 for more than three years. Of the others, 26 had died within one month of the start of therapy, 44 at the end of three months, 67 at six months, 77 at one year, 79 at two years, and 80 at the end of three years. One of the three deaths after the first year was due to meningitis, one to renal tuberculosis, and one to streptomycin hypersensitivity during therapy for recurrent meningitic signs. All but 2 of the 100 were adults; 59 were women and 41 men. Of the 20 survivors, 10 were men and 10 women. Miliary tuberculosis was present in 40 patients; only 5 (12.5 per cent) of these patients were alive. Four of the 20 survivors had recurrent meningitis, perhaps because therapy was brief. Another 3 have developed tuberculosis elsewhere in their bodies. It seems that streptomycin may cure tuberculous meningitis permanently.—*La guérison de la méningite tuberculeuse après streptomycinothérapie apparaît comme un guérison durable, E. Bernard & A. Lotte, Bull. Acad. nat. méd., July, 1951, 135: 384.*—(*L. B. Hobson*)

Intermittent Streptomycin.—The authors previously reported that *in vitro* streptomycin-sensitive tubercle bacilli were completely inhibited by exposure to 10γ of streptomycin per ml. for eight hours daily, almost completely if exposed for eight hours every other day, and significantly if exposed only every third day. Exposure to 20γ per ml. sometimes was effective every fourth day. This effect was tested *in vivo* using series of 8 tuberculous guinea pigs each. Two series received 20 mg. of streptomycin per kg. of body weight daily; another series was given 40 mg. per kg. every second day; two other series received the same dose every third day; and the remaining two series served as untreated controls. As judged by the weight of the spleen and lymph nodes, as well as by pathologic findings, there was no significant difference in the effects of the various treatment regimens. This supports the advisability of intermittent streptomycin therapy.—*Bases experimentales de la streptomycinotherapie en injections espacées (tous les deux ou trois jours), E. Bernard & B. Kreis, Bull. Acad. nat. méd., 1951, Nos. 27 & 28: 492.*—(*L. B. Hobson*)

Intermittent Streptomycin.—A series of 100 tuberculous patients, including 36 men, 39 women, and 25 children, was treated with dihydrostreptomycin, 1 gm. every third day for a toal of 24 to 74 gm. *p*-Aminosalicylic acid, 12 gm. daily, was given to 47 of the 100 patients, and collapse therapy was employed when indicated. Of the patients, 24 were apparently cured, 32 were distinctly improved, 14 could not be evaluated, and 30 were not benefited. Children responded less satisfactorily than adults, but the results as a whole were as good as those obtained with daily streptomycin. Of 6 patients treated for 130 to 164 days, 3 continued to produce bacilli sensitive to 1γ of streptomycin per ml.; the bacilli from the other 3 were resistant to 50γ per ml.—*Les injections de dihydrostreptomycine espacées un jour sur trois dans le traitement de la tuberculose, E. Bernard, B. Kreis, A. Libert, & Abric, Bull. et mém. Soc.*

méd. d. hôp. de Paris, 1951, Nos. 23 & 24, 911.—(*L. B. Hobson*)

Drug Resistance.—The emergence of drug-resistant organisms in patients receiving chemotherapy has presented a serious medical and epidemiologic problem. Tubercle bacilli resistant to streptomycin are similar to other drug-resistant bacteria. Each represents a spontaneous random genetic change, which is an inheritable characteristic, being transmitted from generation to generation whether or not subsequent generations are grown in a medium containing drug. Proof that this is not due to exposure of the organism to the drug has been given by the statistical analyses of Luria and Delbrück and the recent work of Lederberg. No method of reducing the number of mutations is known. On the other hand, if only one cell in a million (10^6) mutates to resistance to one drug and one in a million (10^6) to another drug, this reduces the likelihood of a cell mutating to resistance to both drugs to one in a million million (10^{12}). This negligible probability of the emergence of a doubly resistant mutant from a sensitive strain in the presence of effective concentrations of two chemotherapeutic agents is the basis for use of such combinations of drugs as *p*-aminosalicylic acid and streptomycin.—*Bacterial genetics and drug resistance, B. Davis, Pub. Health Rep., April, 1952, 67: 376.*—(*S. Hadley*).

Type of Pulmonary Lesions and Streptomycin Resistance.—Streptomycin resistance is more likely to develop among tuberculosis patients with gross caseated or cavitary lesions. Among 59 cases of cavitary tuberculosis, 50 (84.7 per cent) showed streptomycin resistance, even following the use of small amounts of the drug. The rate increased as the treatment continued. Streptomycin should be kept for use in nodular and noncavitary lesions of a predominantly exudative type. In frankly ulcerated and caseous cases, the drug should be associated with other therapeutic measures. As a rule, *p*-aminosalicylic acid should be combined with streptomycin in order to defer or avoid development of streptomycin resistance.—*Influência do tipo da lesão pulmonar no aparecimento da estreptomicino-resistência, H. Fraga, M. Fontes Magarão, & J. Dauster, Clín. tisiol., January-February, 1952, 7: 59.*—(*A. A. Moll*)

Reversal of Streptomycin Resistance.—A patient with far advanced pulmonary tuberculosis, whose tubercle bacilli were sensitive to streptomycin prior to therapy with that drug, yielded bacilli with a high degree of streptomycin resistance, and, coincidentally, failed to respond to the drug. After being consistently demonstrated for twenty months, the streptomycin-resistant bacilli disappeared from the sputum coincident with the disappearance of a *left* lung cavity, leaving only streptomycin-sensitive bacilli in the sputum and a cavity in the *right* lung. The *in vivo* streptomycin sensitivity of these bacilli was then clearly demonstrated by prompt disappearance of the remaining *right* lung cavity and conversion of sputum during subsequent streptomycin-*p*-aminosalicylic acid therapy. From approximately 800 cases studied in five years at the Trudeau Laboratory, 5 additional cases (0.75 per cent) were found in which streptomycin-resistant tubercle bacilli from cultures of sputum were replaced by streptomycin-sensitive organisms. In only 2 of these cases were the bacilli highly resistant to 1,000 γ of streptomycin or more per ml.—*The recovery of streptomycin-sensitive tubercle bacilli from a patient with pulmonary tuberculosis who had previously yielded highly resistant bacilli, R. S. Mitchell, E. Wolinsky, & W. Steenken, Jr., Ann. Int. Med., May, 1952, 36: 1309.*—(*T. H. Noehren*)

Methylene Blue and Colloidal Copper for Chemotherapeutic Reactions.—Among 32 cases of advanced pulmonary tuberculosis treated with streptomycin and *p*-aminosalicylic acid, 11 developed toxic manifestations, including headache, tinnitus, giddiness, vomiting, loss of appetite, gastric pains, and diarrhea. These complications, which might otherwise have compelled discontinuance of

treatment, were effectively controlled through intravenous use of colloidal copper morrhuate and 2 per cent methylene blue.—*Acción del azul de metileno y de las sales de cobre coloidal en el curso del tratamiento de la tuberculosis pulmonar por antibióticos y la quimioterapia, A. Pareja Coronel, E. Rendón, & M. Luna Builova, Clín. tisiol., January–February, 1952, 7: 37.*—(*A. A. Moll*)

Chaulmoogra Oil and Streptomycin.—Twenty patients with pulmonary tuberculosis received whole chaulmoogra oil enriched with 880 units of vitamin A per gram as well as streptomycin and para-aminosalicylic acid. The product was administered in a dose of 2 cc. daily during the first week and 5 cc. daily during the following weeks. The treatment did not give rise to any general or local reactions. The association of these substances always produced a remarkable effect on the general condition. In 70 per cent of the cases, there was more or less marked roentgenologic clearing. Often chaulmoogra oil seemed to restore previously lost streptomycin effectiveness. Two cases are noteworthy in that, after streptomycin had become ineffective, the addition of chaulmoogra oil produced considerable absorption of lesions and made the patients eligible for surgical treatment; tubercle bacilli found in their sputum showed regression of streptomycin resistance (Authors' summary).—*L'association huile de chaulmoogra-streptomycine en tuberculose pulmonaire, H. Warembourg & G. Niquet, Presse méd., October 24, 1951, 59: 1387.*—(*V. Leites*)

Potassium Iodide with Streptomycin.—As suggested by Woody and Avery, potassium iodide was given along with streptomycin for thirty days to 13 male patients with pulmonary tuberculosis. Several of them had previously received streptomycin. Potassium iodide was given in gradually increasing doses of 0.25 to 1.0 gm. daily, the total dosage amounting to 23 gm. The dosage of streptomycin was 0.5 gm. every twelve hours, the course totaling 30 gm. General improvement was remarkable, with an increase in weight, disappearance or subsidence of cough, and return of temperature to normal in all cases. Following a marked increase during the first week of treatment, expectoration ceased altogether in 12 of the 13 cases. Most marked roentgenographic improvement was in 6 advanced cases and one minimal case which was considered as probably cured. The only patient with no roentgen amelioration had a giant cavity in the right lung. Among the 13 cases, the sputum became negative in 9. Even one streptomycin-resistant case showed both roentgenographic and clinical improvement. No untoward reactions developed following this therapy. While the number of cases is too small for final conclusions, results justify further trial of this method.—*Ação da estreptomicina associada ao iodureto de potássio, S. Mendes Figueredo & J. R. Machado, Clín. tisiol., January–February, 1952, 7: 95.*—(*A. A. Moll*)

Tuberculostasis with Dihydrostreptomycin-*p*-Aminosalicylate.—The *in vitro* growth of the H37Rv strain of tubercle bacilli was inhibited by 0.82 γ of dihydrostreptomycin (DHSM) per ml. alone or by dihydrostreptomycin-*p*-aminosalicylate (DHSM-PAS) containing 0.41 γ per ml. of DHSM, or by DHSM with PAS, containing 0.205 γ of DHSM per ml. In the latter two cases, the concentration of PAS was in a 3:1 molecular ratio of PAS: DHSM. The fifth serial transfer of H37Rv into increasing concentrations of DHSM resulted in a strain growing readily in more than 2,000 γ of DHSM per ml., while the tenth such transfer of the organisms into increasing concentrations of DHSM-PAS resulted in a strain growing readily in more than 1,000 γ of DHSM-PAS per ml. No increase in resistance on the part of organisms transferred into increasing concentrations of DHSM with PAS present in a 1:3 molecular ratio has so far been found. Organisms resistant to the compound (DHSM-PAS) were found to be also resistant to DHSM alone, to PAS alone, and to the mixture of DHSM and PAS.—*Comparative in vitro response of tubercle bacillus (H37Rv)*

to dihydrostreptomycin, para-aminosalicylic acid, and dihydrostreptomycin-para-aminosalicylate, K. Vennesland, J. Altona, & R. G. Bloch, Proc. Soc. Exper. Biol. & Med., November, 1950, 75: 436.—(F. B. Seibert)

Phenyl-*p*-Aminosalicylate.—Among various derivatives of *p*-aminosalicylic acid (PAS) studied at the Paris Pasteur Institute, phenyl-*p*-aminosalicylate (FR_7) was found to be the most effective *in vitro* and *in vivo* against tubercle bacilli. FR_7 was found to be 10 to 16 times as active as PAS on Youmans' medium or on serum. The inhibitory effect was evident toward human strains, bovine strains, and strains resistant to streptomycin and PAS. The activity of one molecule of FR_7 was neutralized by 20 molecules of *p*-aminobenzoic acid (PABA), while one molecule of PAS was neutralized by one molecule of PABA. In experimental murine tuberculosis, with twenty-one to twenty-six days of treatment, 1 mg. of FR_7 in subcutaneous daily injection was as effective as daily doses of 1 mg. of streptomycin or 10 mg. of PAS. With more prolonged treatment for sixty days, the effects of FR_7 were more comparable to those of streptomycin than of PAS. The activity of FR_7 was the same, whether it was administered daily or every three days in a triple dose. There was synergism between streptomycin and FR_7. Aqueous suspensions were more effective and more toxic than oily solutions. The toxicity with subcutaneous administration was minimal.—*Un nouveau dériré du PAS. Le para-amino-salicylate de phenyle ou FR_7: Activité tuberculostatique in vitro et chez la souris, S. Americano Freire, N. Rist, & F. Grumbach, Ann. Inst. Pasteur, October, 1951, 81: 407.—(V. Leites)*

Antituberculosis Activity of Pyrazinoic Acid Amide.—Using mice infected with H37Rv strain of *M. tuberculosis*, a comparison of the effects of pyrazinoic acid amide, nicotinamide, and *p*-aminosalicylic acid was made. Under suitable experimental conditions, the pyrazinoic acid amide appeared more active than both of the other compounds, and was effective when given either orally or parenterally. The pyrazinoic acid amide was found active when administered both orally and parenterally. The *in vitro* inhibitory concentration was 150 γ per ml. in Dubos Tween-albumin medium. Resistance developed rapidly *in vitro*.—*Pyrazinoic acid amide—an agent active against experimental murine tuberculosis, M. Solotorovsky, F. J. Gregory, E. J. Ivanson, E. J. Bugie, R. C. O'Neill, & K. Pfister, 3rd, Proc. Soc. Exper. Biol. & Med., April, 1952, 79: 563.—(F. B. Seibert)*

In Vivo Micrococcin-Triton.—The addition of a detergent "Triton WR-1339" to micrococcin made it more soluble and did not itself influence bacterial growth; it was partially antagonistic to the antibacterial action of micrococcin. Large intravenous doses of the micrococcin-Triton solution damaged the renal glomeruli, but smaller doses had no such action and appeared to be nontoxic. The distribution of micrococcin was followed in frozen sections by its purple fluorescence in ultraviolet light. Immediately after intravenous injection, the micrococcin-Triton was present in considerable amounts in the lung, but after two or three days it became distributed in the cells of the reticuloendothelial system, especially in the spleen and liver, where it could be detected after five months. It probably did not penetrate into the tissue fluids or tubercles in significant amounts. Assay of micrococcin in ethanol extracts of the organs confirmed the histologic observations. The course of experimental tuberculosis and the nature of the lesions in guinea pigs were not significantly influenced by repeated intravenous injections of micrococcin-Triton solution.—*The effect on experimental tuberculosis and other infections of micrococcin-Triton solution, N. G. Heatley, J. L. Gowans, H. W. Florey, & A. G. Sanders, Brit. J. Exper. Path., April, 1952, 33: 105.—(H. J. Henderson)*

Antituberculous Activity of Garlic.—Garlic has been used for generations to treat tuberculosis, so it was decided to test it by methods

employed with other supposed antituberculous agents. *In vitro*, aqueous and alcoholic extracts had inhibitory action at concentrations of approximately 1.5 mg. per ml. and hence were much less active than *p*-aminosalicylic acid. Guinea pigs fed 2.0 gm. of garlic daily after experimental infection with tubercle bacilli had as extensive disease as did the untreated controls. Thus, garlic has no antituberculous activity *in vivo.—Antitubercular activity of garlic (Allium sativum), J. C. Suri, Indian J. M. Research, July, 1951, 39: 411.—(L. B. Hobson)*

LABORATORY STUDIES

Experimental Tuberculosis with Young Tubercle Bacilli.—Guinea pigs and rabbits infected with 1 to 10 young tubercle bacilli developed discrete tuberculous lesions of limited extent or only transient tuberculin allergy. The findings were similar to those produced with filtrates of young tubercle bacilli through a Chamberland filter under pressure of 50 to 60 cm. of mercury. Studies were made on guinea pigs with various specimens from patients with early or suspected tuberculosis. Of 403 specimens, 135 produced tuberculosis in the inoculated animals; in the remaining 268 cases, in which tubercle bacilli could not be demonstrated, there were 24 cases which showed tuberculin allergy and hypertrophy of the tracheobronchial lymph nodes. No tubercles or acid-fast bacilli could be demonstrated in these nodes. In 12 of these 24 cases, "abortive tuberculosis" in the guinea pig was produced by the inoculation of blood of patients with erythema nodosum, pulmonary tuberculosis, and blood from the umbilical cord when the mother was tuberculous; in the other 12 cases the specimens came from the mesenteric nodes of a newborn from a tuberculous mother, skin biopsy of a sarcoid case, pleural fluid, a case of osteitis, et cetera. It is believed that this abortive form of tuberculosis in the guinea pig is due to bacilli not yet completely developed, less virulent than older bacilli, and more susceptible to the action of phagocytes because of their lower lipid content. This also explains their more rapid disappearance from the organism of the inoculated guinea pig.—*Infection tuberculeuse abortive du cobaye determinée par l'inoculation d' une ou quelques unités de bacilles tuberculeux jeunes ou de produits pathologiques humains prélevés chez des sujets suspects de tuberculose ou atteints de cette maladie, L. Nègre & J. Bretey, Ann. Inst. Pasteur, February, 1952, 82: 132.—(V. Leites)*

Experimental Tuberculosis.—A series of 136 guinea pigs was divided into 4 groups: 2 of these were injected with living tubercle bacilli subcutaneously or into the testicle; the 2 other groups received dead tubercle bacilli by the same routes. The living or dead tubercle bacilli were administered either as a bacillary emulsion in saline (control groups) or in a fatty or oily substance (butter, oil of colza, and vaseline oil) previously injected subcutaneously or into the testicle. The results were evaluated according to the intensity of the local reaction, the course of infection, tuberculin allergy, and autopsy findings. Subcutaneous injection of 0.04 to 0.1 mg. of living tubercle bacilli was performed in the para-umbilical region. In the animals injected with living tubercle bacilli in butter, the local lesions appeared earlier than in the controls and were more extensive, sometimes involving the entire abdominal wall. Tuberculin allergy was of lower intensity than in animals receiving bacilli in saline. The differences were not so marked between the groups injected with bacilli in saline and in oil of colza or vaseline. The local lesions were comparable in these groups, but some animals which received the oil had more lymph node and spleen enlargement than the controls. Animals injected with living tubercle bacilli into the testicle received 0.04 to 0.1 mg. of bacilli and 0.2 cc. of fatty substance. Guinea pigs injected with the bacillary suspension in butter had more marked testicular lesions than the controls, as well as more frequent extension of the tuberculous process to the peritoneum and to the lungs. There was no difference in tuberculin allergy between the groups. Bacilli injected into the testicle with

vaseline and colza oil produced reactions similar to those in the controls. Dead bovine bacilli were injected under the same conditions, either at the same dose or at a dose 10 to 100 times larger but not exceeding 10 mg. Dead bacilli alone and in small doses gave no local reactions and little tuberculin allergy. No tuberculous lesions were seen at autopsy. Injection of 10 mg. of dead bacilli into the testicle produced slight local reactions and tuberculin allergy. In combination with fatty substances, the same doses produced more pronounced testicular lesions in the form of orchitis; tuberculin allergy was more intense. Autopsy showed, in addition to the testicular changes, caseous lymph nodes containing numerous tubercle bacilli. This series also showed the more marked effect of butter as compared with the oils.—*Contribution à l'étude du rôle du beurre, de l'huile de colza et de l'huile de vaseline associés à des bacilles tuberculeux vivants ou morts, inoculés au cobaye par les voies sous—cutanées et testiculaire, P. Gastinel & A. Nevot, Ann. Inst. Pasteur, April, 1952, 82: 425.—(V. Leites)*

Virulence Test for Mycobacteria.—To determine whether intracutaneous or subcutaneous inoculations could distinguish better and more quickly between virulent and saprophytic *Mycobacteria*, guinea pigs were injected by both routes with an unknown culture. There was close correlation between the results obtained. An intracutaneous test was considered positive when a persistent ulcer formed at the site of inoculation by the end of six weeks, and when a smear of the regional lymph node revealed acid-fast bacilli. Finding bacilli in a regional lymph node also was the criterion of a positive subcutaneous inoculation. All of the animals were autopsied six weeks after inoculation. Intracutaneously, virulent tubercle bacilli usually produced an ulcer within two or three weeks in the dose of 0.01 mg., one-tenth of the amount used subcutaneously. Also, 4 cultures could be tested on a single animal if administered accurately. The intracutaneous method, however, had the following disavantages: (*1*) The premature death of one guinea pig meant the loss of several tests at one time. (*2*) Intracutaneous inoculation was more difficult. If part or all of the suspension were accidently inoculated subcutaneously, an ulcer might fail to develop even though the inoculum contained virulent bacteria. (*3*) Open ulcers on a guinea pig were a constant danger to animal caretakers and others. (*4*) The inoculum might spread through the lymphatics from the point of inoculation to involve lymph nodes in another region of the animal and confuse the results.—*Distinguishing saprophytic from virulent Mycobacteria by intracutaneous inoculation of guinea pigs, J. H. Kite, Jr., R. A. Patnode, & T. Read, Jr., Am. J. Clin. Path., March, 1952, 22: 250.—(J. S. Woolley)*

Filtrable Elements of Tubercle Bacilli.—Experiments showed that elements of human and bovine tubercle bacilli less than eight days old were able to traverse Chamberland filters L_4, which retained the *Coccobacillus* of chicken cholera. These young elements of tubercle bacilli could not be demonstrated in the filtrate by culture on Löwenstein medium. Their presence could only be revealed by the intravenous inoculation of the filtrates into guinea pigs or rabbits at the dose of 1 or 2 cc. An important proportion of the animals thus inoculated reacted temporarily to tuberculin. Among those animals which became tuberculin reactors, acid-fast bacilli were found in rare instances in rabbit lungs and in the hypertrophic tracheobronchial lymph nodes of guinea pigs. Culture of these organs on Löwenstein medium and their reinoculation into new guinea pigs remained negative. Intravenous inoculation of rabbits with these filtrates produced tuberculosis in some cases, but only if the filtrates were obtained with pressures above 60 cm. of mercury. In no case did the bacillus of chicken cholera traverse the Chamberland filter L_4. In order to obtain tuberculin conversion of guinea pigs by subcutaneous administration of filtrates of young cultures obtained with pressures above 50 cm. of mercury, doses 10 to 15 times greater than with intravenous injection had to be em-

ployed, given in 2 divided doses with an interval of three days. Guinea pigs and rabbits inoculated intravenously with filtrates of cultures older than thirty days did not show tuberculin conversion. In contrast to the classic opinion, according to which tubercle bacilli are able to traverse Chamberland filters L_9 under pressures above 50 cm. mercury, it is believed that this property is limited only to young tubercle bacilli. Intravenous inoculation of rabbits and guinea pigs with filtrates of tubercle bacilli less than eight days old obtained with pressures below 30 cm. mercury did not give the same results as cases in which filtrates had been prepared with pressures higher than 50 cm. The same negative results were seen after inoculation of animals with filtrates of heat-killed bacilli older than thirty days, regardless of the pressure used for filtration. Thus, it seems that the hypothesis of a tuberculous ultra-virus traversing Chamberland L_3 filters at a pressure below 30 cm. mercury can be discarded. The elements traversing these filters at pressures above 50 cm. are neither dead nor living fully developed bacilli, but living bacilli at a young stage (Authors' summary).—*Cultures jeunes de bacilles tuberculeux et éléments filtrables de ces germes, L. Nègre & J. Bretey, Ann. Inst. Pastuer, January, 1952, 82: 1.—(V. Leites)*

Metabolism of *p*-Aminobenzoic Acid by Mycobacterium Smegmatis.—Washed *Mycobacterium smegmatis* cells are capable of forming *p*-aminophenol from both aniline and PABA.—*Studies on the metabolism of p-aminobenzoic acid by Mycobacterium smegmatis, N. H. Sloane, C. Crane, & R. L. Mayer, J. Biol. Chem., December, 1951, 193: 453.—(F. B. Seibert)*

Phthioic Type Acids in Tubercle Bacillus.—A mixture of acids of the phthioic type has been shown to contain at least 12 components, ranging in molecular weight from C_{32} to C_{21}. One acid has been isolated in a pure condition and termed C_{27}-phthienoic acid. The evidence indicated this acid to be a 2-alkyl-2-alkenoic acid, with a second substituent in the 4 or 5 position, and a third substituent on a carbon more remote from the carboxyl. The physical data also indicated that the mixture contains other acids of similar structure to C_{27}-phthienoic acid but of different molecular weight. After hydrogenation, a saturated branched chain acid, termed C_{29}-phthianoic acid, has also been isolated.—*Investigation of a fraction of acids of the phthioic type from the tubercle bacillus, J. Cason & G. Sumrell, J. Biol. Chem., September, 1951, 192: 405.—(F. B. Seibert)*

Growth of H37Rv Strain of M. Tuberculosis on Blood.—Human blood, washed red cells, plasma, and serum initiated the growth of H37Rv strain of *M. tuberculosis*, beginning with 5 to 50 organisms. The active component in erythrocytes appeared to be hemoglobin. Individual purified components of plasma (I to V) and various combinations of these initiated growth only from large inocula (500,000 to 5,000,000 organisms), and a mixture of fractions I and V seemed to be the best. Similar results were obtained with bovine proantithrombin, fibrinolysin, and prothrombin.—*Multiplication of the H37Rv strain of M. tuberculosis on blood and its derivatives, A. W. Frisch, Proc. Soc. Exper. Biol. & Med., February, 1952, 79: 281.—(F. B. Seibert)*

Viability of BCG Vaccine.—Comparisons of 204 consecutive weekly lots of BCG vaccine prepared under standardized conditions were found to be satisfactorily uniform in the number of viable organisms and clumps of organisms they contained. In the vaccine when stored at 2° to 4°C., approximately 50 per cent of the BCG elements remained viable in a three-week-old vaccine, 30 per cent in the vaccine six weeks old, and 2 per cent survived for one year.—*Influence of storage on viability of BCG vaccine, K. Birkhaug, Proc. Soc. Exper. Biol. & Med., February, 1951, 76: 311.—(F. B. Seibert)*

Irradiated Tuberculous Vaccine.—Several lots of ultraviolet-killed virulent human-type

tubercle bacilli (H37Rv) vaccine were prepared which were equal or slightly superior in antigenic potency to a standard BCG vaccine when tested in line 1 dba mice. The irradiated vaccine preserved with 1:10,000 merthiolate was stable and retained its immunogenicity for as long as twelve months after preparation.—*Immunization of mice with ultraviolet-killed tuberculosis vaccines, A. Milzer, S. O. Levinson, & M. B. Lewis, Proc. Soc. Exper. Biol. & Med., December, 1950, 75: 733.—(F. B. Seibert)*

Effect of Cortisone on Tuberculosis.—Rats injected with virulent tubercle bacilli did not die of tuberculous infection, but when treated with cortisone, they did die. Histologically localized granulomatas were seen in the organs of rats injected only with tubercle bacilli, whereas the lesions in the animals also receiving cortisone were diffuse and contained fewer inflammatory cells. The influence of cortisone appears to be a lowering of the host's natural resistance.—*Course of experimental tuberculosis in the albino rat as influenced by cortisone, M. Michael, Jr., M. M. Cummings, & W. L. Bloom, Proc. Soc. Exper. Biol. & Med., November, 1950, 75: 613.—(F. B. Seibert)*

Tuberculin Test After ACTH and Cortisone.—Corticotropin (ACTH) and cortisone, when given in proportionately large dose, modified but did not abolish cutaneous tuberculin reaction in tuberculous guinea pigs. Upon treatment the histopathologic changes consisted in a quantitative diminution in the inflammatory exudate rather than a qualitative change in its cytologic structure.—*Response of tuberculin skin test to ACTH and cortisone in tuberculous guinea pigs, V. J. Derbes, J. H. Dent, N. K. Weaver, & D. D. Vaughan, Proc. Soc. Exper. Biol. & Med., November, 1950, 75: 423.—(F. B. Seibert).*

Tuberculin Reaction After ACTH or Cortisone.—Administration of corticotropin (ACTH) or cortisone to guinea pigs with active progressive tuberculosis did not obliterate the tuberculin skin reaction but appeared to diminish its intensity. It is suggested that the ACTH or cortisone does not interfere primarily with the immune mechanism of the tuberculin skin reaction but decreases the associated acute inflammatory process.—*Failure of ACTH or cortisone to suppress tuberculin skin reactions in tuberculous guinea pigs, W. H. Sheldon, M. M. Cummings, & L. D. Evans, Proc. Soc. Exper. Biol. & Med., November, 1950, 75: 616.—(F. B. Seibert).*

Hemagglutination Test for Tuberculosis.—Chicken, duck, and human group O erythrocytes were sensitized equally well with Old Tuberculin (OT) diluted 1:10, but sensitized chicken cells formed larger and more distinct agglutinated masses in the presence of tuberculous sera. Tuberculin obtained from glycerin-broth cultures sensitized well only if the tubercle bacilli were of the human type; when Sauton's medium was used, bovine-type bacilli also yielded sensitizing tuberculin. Purified protein derivative was incapable of sensitizing erythrocytes. Using chicken erythrocytes sensitized with human-type OT, the hemagglutination titers and clinical courses were compared during four months for a series of 30 patients with pulmonary tuberculosis. Of these patients, 6 were treated with thoracoplasty, 6 with thoracoplasty and streptomycin, and 18 with pneumothorax and streptomycin or para-aminosalicylic acid (PAS). The clinical course was favorable in 11 cases; in 9, the titer decreased; and in one each, there was no change and increase in titer. Of 5 patients who showed some improvement, 3 had decreased titer and one each had no change or a transient decrease in titer. No change in the clinical course or titer occurred in 4 cases. Among 10 patients who showed deterioration, 5 had a transient decrease and 5 an increase in titer. These results roughly paralleled those obtained by comparing the hemagglutination with the production of tubercle bacilli; the sedimentation rate, the temperature, and weight change. A decrease in titer was noted more often in patients with

productive or mixed than with exudative disease. Arrested cases and those treated with thoracoplasty, as contrasted with progressive cases and those treated with pneumothorax, showed a greater tendency toward decreasing titers. The cerebrospinal fluid agglutinated sensitized erythrocytes at low titers in 2 of 4 cases of tuberculous meningitis but in none of 6 cases of nontuberculous meningitis. Hemagglutination could not be produced using 15 urine specimens from patients with genitourinary tuberculosis.—*Variations in specific hemagglutination reaction in the course of tuberculosis, H. Yaoi, M. Takei, H. Maeda, & H. Nishi, Yokohama Med. Bull., June, 1951, 2: 161.*—(*L. B. Hobson*)

Evaluation of Hemagglutination Test.—Using the hemolytic modifications, the hemagglutination test for antibodies in tuberculosis was performed on: (*1*) a series of nontuberculous control persons and on a series of patients with known active tuberculosis, and (*2*) a series of normal persons immediately before, and at one-week and two-week intervals after, skin testing with a first-strength dose of PPD tuberculin. Those who did not react to this dose were given the second-strength dose, and their serum was retested as before. Only 3 (less than 1.5 per cent) of 226 nontuberculous persons gave a positive serologic test. In a series of 58 patients with active tuberculosis, two-thirds of the sera gave negative hemolytic reactions. These were mainly from minimal and moderately advanced cases. Two-thirds of the sera from far advanced cases reacted. Of 47 serologic-negative individuals, 17 became positive at low titers following their tuberculin tests. "Blocking antibodies" were sought but not found in the serum of patients with active pulmonary tuberculosis but with negative serologic reactions. In an attempt to increase the sensitivity of the test, the sheep erythrocytes were treated with Forssman antibody prior to adsorption of the tuberculin. Of 35 sera from tuberculous patients, 16 gave negative results with both the original method and with the specially treated erythrocytes and 9 sera gave equal titers. Five sera (14 per cent) which were negative by the original method had a low but positive titer. Although the hemolytic test rarely gave positive results in persons without clinical evidence of tuberculosis, the results in active cases were discouraging. The negative results among the latter are explained if the method was not sufficiently sensitive to detect small amounts of antibody. A positive reaction strongly suggests the presence of tuberculous disease, but a negative reaction cannot be considered evidence against tuberculosis.—*Evaluation of hemolytic modification of Middlebrook-Dubos test for tuberculous antibodies, B. Gerstl, D. Kirsh, E. M. Andros, J. W. Winter, & L. E. Kidder, Am. J. Clin. Path., April, 1952, 22: 337.*—(*J. S. Woolley*)

Hemagglutination Tests.—Hemagglutination tests by the method of Middlebrook and Dubos were made on 53 patients with progressive tuberculosis and 45 patients with nontuberculous conditions. The test was positive in 70 or 80 per cent of the cases of progressive tuberculosis. It was negative in a number of cachectic cases. It was positive in 20 per cent of the cases without tuberculous lesions. Included in this control group were cases of pneumonia, lung abscess, bronchiectasis, gastric ulcer, and endocarditis. While the reaction was positive in 70 to 80 per cent of cases of positive tuberculosis, it cannot at the present time be considered of great value since it was also positive in 20 per cent of nontuberculous cases.—*Premiers résultats de la réaction d'hémagglutination de Middlebrook-Dubos, J.-M. Verstraeten, Acta tuberc. belg., April, 1952, 43: 142.*—(*A. T. Laird*)

Tuberculin Hemagglutinins in Leprosy.—The hemagglutination titers of active, bacteriologically positive cases of Hansen's disease were significantly higher than those of arrested, bacteriologically negative cases of this disease and frequently much higher than those encountered in the active cases of tuberculosis examined. The immunologic response against antigenic components of the

tubercle bacillus elicited with Hansen's disease appears to be very marked and distinct.—*Hemagglutination of tuberculin-sensitized sheep cells in Hansen's disease (leprosy), M. Levine, Proc. Soc. Exper. Biol. & Med., January, 1951, 76: 171.*—*(F. B. Seibert)*

Reflex Respiratory Stimulation.—Ventilatory stimulation by chest compression was induced by negative pulmonary pressure breathing in dogs under deep sodium pentobarbital anesthesia. Bilateral and frequently right vagus block alone abolished this reflex. The degree and pattern of the respiratory response following chest compression by negative pressure depends upon the level of anesthesia and the applied pressure. During complete respiratory arrest, while breathing oxygen, ventilation may be induced at any time by this method. The lung volume displacement for a given negative pressure was greater the deeper the anesthesia. Vagotomy, at any stage of anesthesia, likewise produced a larger volume to pressure ratio upon application of pressure, indicating the importance of the vagus for the maintenance of chest tone. The application of chest compression in resuscitation is discussed (Authors' summary). —*Reflex respiratory stimulation by chest compression in the dog, G. A. Culver & H. Rahn, Am. J. Physiol., March 1, 1952, 168: 688.*—*(G. C. Leiner)*

Conservation of Arterial Grafts.—Blood vessel grafts have been preserved experimentally in (*1*) physiological solutions which attempt to preserve their vitality; or (*2*) histologic fixatives which paralyze or destroy their vitality. The liquid of Gross and his co-workers preserves the vitality of the graft two weeks or longer but demands constant attention in maintaining the pH. The recent use of antihistaminics to preserve blood and solid organs led to the present investigation of Fargan, Neohetramine, Antistine, and Neo-Antergan. Segments of dog aorta were immersed in a 1:1,000 solution of the test substance in physiologic serum. Other grafts were kept as controls in plasma, homologous and heterologous serum, 4 per cent formol, alcohol, and glycerine. Observations were made at appropriate intervals on the macroscopic appearance of the grafts, on variations in pH, on alterations in elasticity, on histologic appearance, and finally, on the results of direct implantation into the thoracic aorta of a dog. It was demonstrated that in 1:1,000 solutions of Fargan (dimethylamino-2-methyl-1-ethyl-N-dibenzo-parathiazine) or of Neohetramine (monochlorhydrate of N'N-dimethyl-N'-parametoxybenzyl-N'(2 pyridyl)-ethylene-diamine) it is possible to preserve arterial grafts for long periods without any important change in their physical characteristics. The slight variations in pH do not interfere with preservation, the elasticity is better preserved than with other methods, the histologic alterations are less severe, and the percentage of successful grafts is greatly increased even after three months' preservation. There was only one instance of thrombosis in 11 grafts. Experiments in progress attempt to demonstrate to what extent it is possible to prevent or limit by this method immunologic reactions which occur between the host and the graft from another species.—*Les anti-histaminiques et la conservation des greffes artérielles, G. Zannini, Poumon, March, 1952, 8: 227.*—*(F. S. Lansdown)*

PUBLIC HEALTH AND EPIDEMIOLOGY

Tuberculosis in Belgium.—Dispensaries maintained by the Belgian Department of Public Health saw 65,618 cases of pulmonary tuberculosis in 1948. As previously reported, 65,668 cases were seen in 1945 and 1946. Among the patients in those years, the largest number were between the ages of 50 and 59 years, and fewer women than men developed tuberculosis in that decade. Of all the cases of pulmonary tuberculosis, 55.5 per cent were progressive, 15.6 per cent had cavities, and at least 10.6 per cent were positive for tubercle bacilli. The right lung was more frequently affected than the left at all ages. The 1948 series was similar except that the greatest number of cases was encountered between 45 and 54 years of age. The propor-

tion of extensive lesions was largest in the age period from 20 to 25 years. Lesions limited to the right lung, developing during this period, are apparently more likely to become extensive 20 years later than lesions found on the left side. Apical lesions were rather rare before 20 years of age, subapical lesions being more frequent then. Among cases classified as stabilized, 5 per cent were positive for tubercle bacilli, and 12 per cent of all cases without cavities were positive for tubercle bacilli. Bacilli were found more frequently with lesions limited to the apex than with those limited to the subapical region.—*Quelques enseignements cliniques de la statistique de la tuberculose en 1948, A. Tuyns, Acta tuberc. belg., April, 1952, 43: 125.*—(*A. T. Laird*)

Elimination of Tuberculous Patients.—Using annual data reported by the Antituberculosis Provincial Association of Rome for 1925 through 1947, the course of tuberculosis was followed in 63,000 cases. From 1925 to 1942, most of the deaths occurred during the first year after discovery of the disease in each annual group of patients; the second year after discovery, the mortality rate fell and it continued to fall until it became stabilized during the ninth or tenth year after discovery. During 1942 and 1943, the mortality rate was high and was the same during the first and second years after discovery. The rate during the first year remained high through 1944. By 1946 the mortality rate during the first year had become very low, perhaps because the war years had seen the death of the less resistant patients and because of improved therapy, including antibiotics. It will be interesting to determine the ultimate effect of modern therapy upon the mortality pattern of tuberculosis.—*L'Eliminazione nel tempo dei tuberculolotici, G. L'Etore & O. Ceino, Lotta contro tuberc., 1950, No. 11-12: 1.*—(*L. B. Hobson*)

Protection of Brazilian Indians Against Tuberculosis.—If Brazilian Indians are to become the valuable human asset they potentially are and unproductive areas of the country are to be turned into sources of wealth, a new farsighted policy must be put into effect. The Indian, now practically the only settler of such lands, must receive full health protection. Vitality-sapping diseases, such as malaria, influenza, blastomycosis, and tokelau, should be actively combated. A special effort must be made to guard this virgin population against tuberculosis, which will unavoidably follow any attempt at industrialization. The obvious weapons are mass roentgenographic surveys, BCG vaccination, control of endemic diseases, and economic and living improvement.—*Plano para una campanha de defesa do indio brasileiro contra a tuberculose, N. Nutels, Rev. brasil. tuberc., January-February, 1952, 20: 3.*—(*A. A. Moll*)

Tuberculosis Trends in Brazilian Cities.—Tuberculosis has completely reversed its trend in the 20 state capitals, which are also the largest cities, of Brazil during the last two decades. In the 1931 through 1940 period, 84.2 per cent of these cities showed a rising tendency in the tuberculosis death rate. In the 1941 through 1950 period, all of them exhibited a decreasing trend. In the earlier period, average rates varied from a maximum of 502 to a minimum of 41 per 100,000; in the more recent period, the range has been from 479 to 109 per 100,000. In the 1945 through 1949 period, tuberculosis was in first place as a cause of death in 7 of the state capitals, in second place in 8, and in third place in 2. The lowest death rate in 1950 occurred in Curitiba with 71 per 100,000 and the highest in Vitoria with 400 per 100,000. Rates for the two largest cities in the country were 193 for Rio de Janeiro and 110 for S. Paulo in 1947.—*Cotêjo da mortalidade por tuberculose nas capitais brasileiras nas duas últimas décadas, M. J. Pereira Filho, A. R. de Albuquerque, & B. de Almeida Rodrigues, Rev. brasil. tuberc., March-April, 1952, 20: 81.*—(*A. A. Moll*)